Automatically Managing Undo

Purpose

This module describes how Oracle Database 10 *g* automates the management of undo.

Topics

This module discusses the following:

Overview

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To simplify management of rollback segments, the Oracle9 *i* database introduced Automatic Undo Management (AUM) where the database automatically manages allocation and management of undo (rollback) space among various active sessions. In a database using AUM, all transactions share a single undo tablespace. Any executing transaction can consume free space in this tablespace. Undo space is dynamically transferred from committed transactions to executing transactions in the event of space scarcity in the undo tablespace. The AUM feature also provides a way for administrators to exert control on undo retention. You can specify the amount of undo to be retained in terms of wall clock time (number of seconds). With retention control, you can configure your systems to allow long running queries to execute successfully without encountering ORA-1555 (Snapshot too old) errors. The undo retention time is specified using a new persistent initialization parameter, UNDO_RETENTION. This parameter is dynamic and hence can be changed anytime during database operation using the ALTER SYSTEM command.

The AUM feature is further enhanced in Oracle Database 10 *g* by providing Automatic Undo Retention Tuning. This feature is used by default, and it automatically determines the optimal undo retention time depending on the size of the undo tablespace. Without your intervention, the Oracle Database 10 *g* dynamically adjusts to the change in undo requirements depending on the system activity. This maximizes the usage of the available space in the undo tablespace and allows long running queries to complete without encountering any “Snapshot Too Old” errors provide your undo tablespace is big enough.

In this lesson, you will intentionally switch to a small undo tbs, and although you use automatic undo retention tuning, you will encounter 1555 because the undo tbs is too small. In which case you need the undo advisor to compute the right size that depends on the workload.

Prerequisites

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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
- ☐ **3.** Download and unzip undoadv.zip into your working directory (i.e. /home/oracle/wkdir)

Creating an Undo Tablespace

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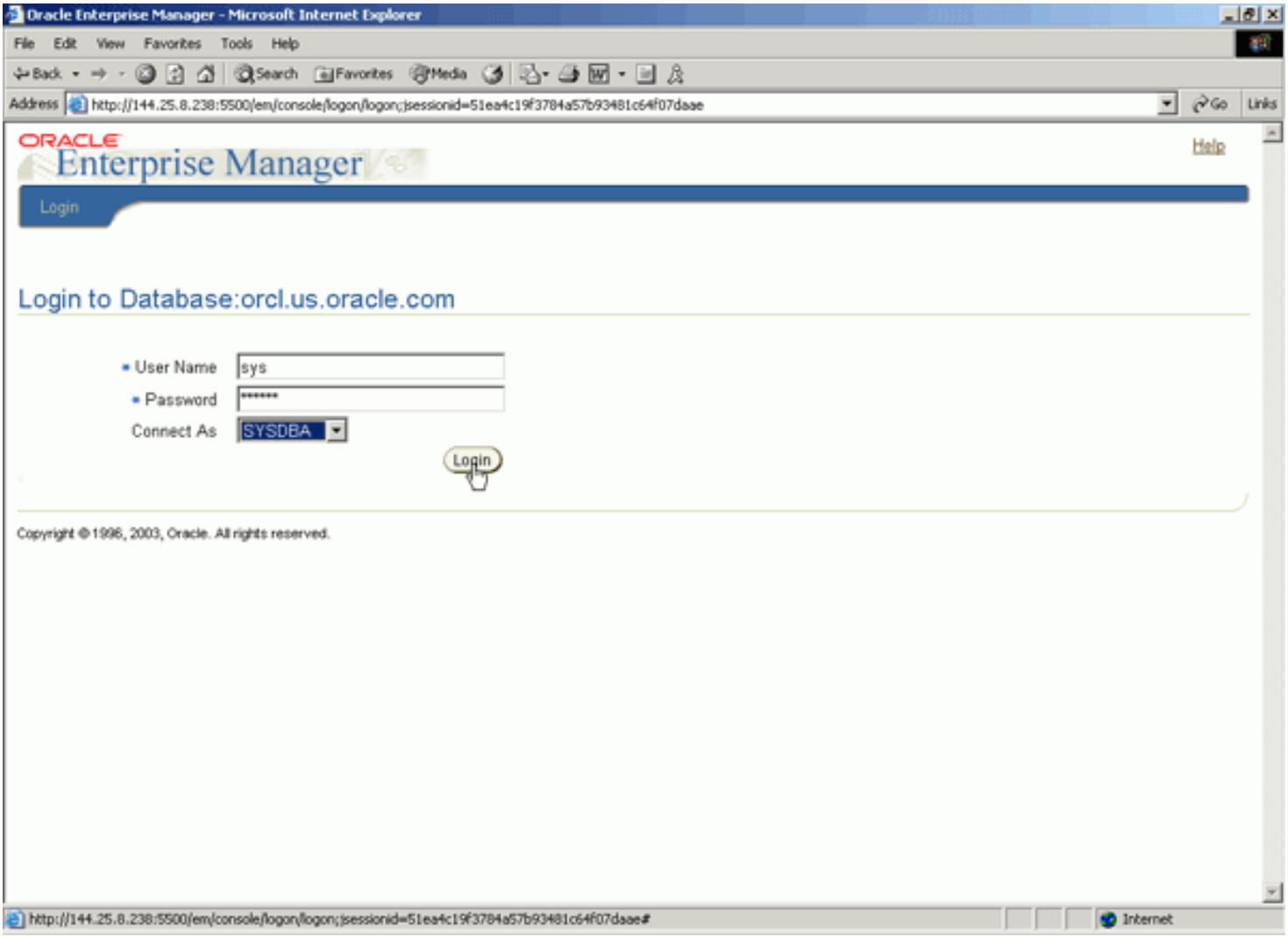
To create an undo tablespace in Enterprise Manager, perform the following

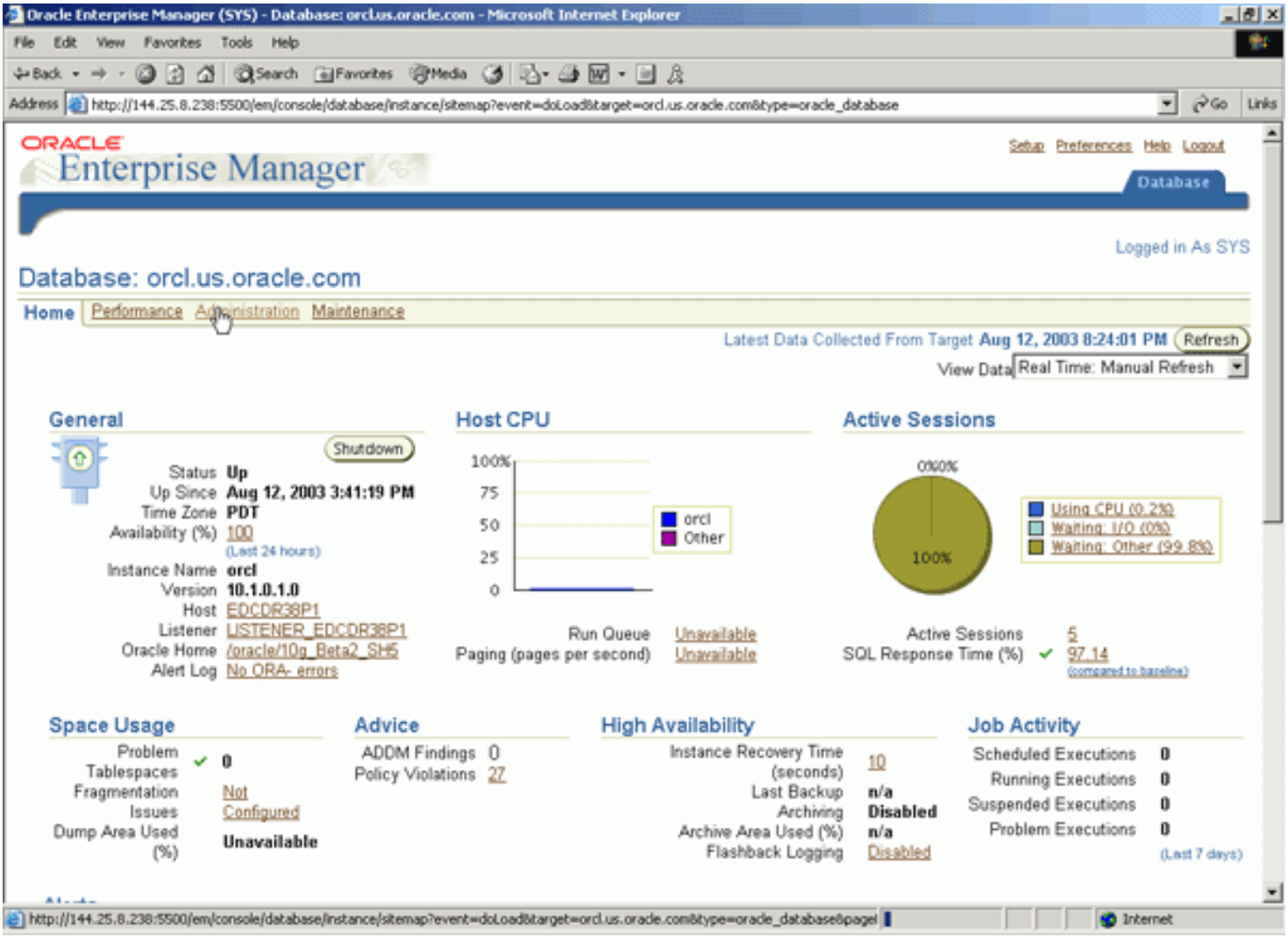
- ☐ **1.** Open your browser and enter the following URL:

  `http://localhost:5500/em`

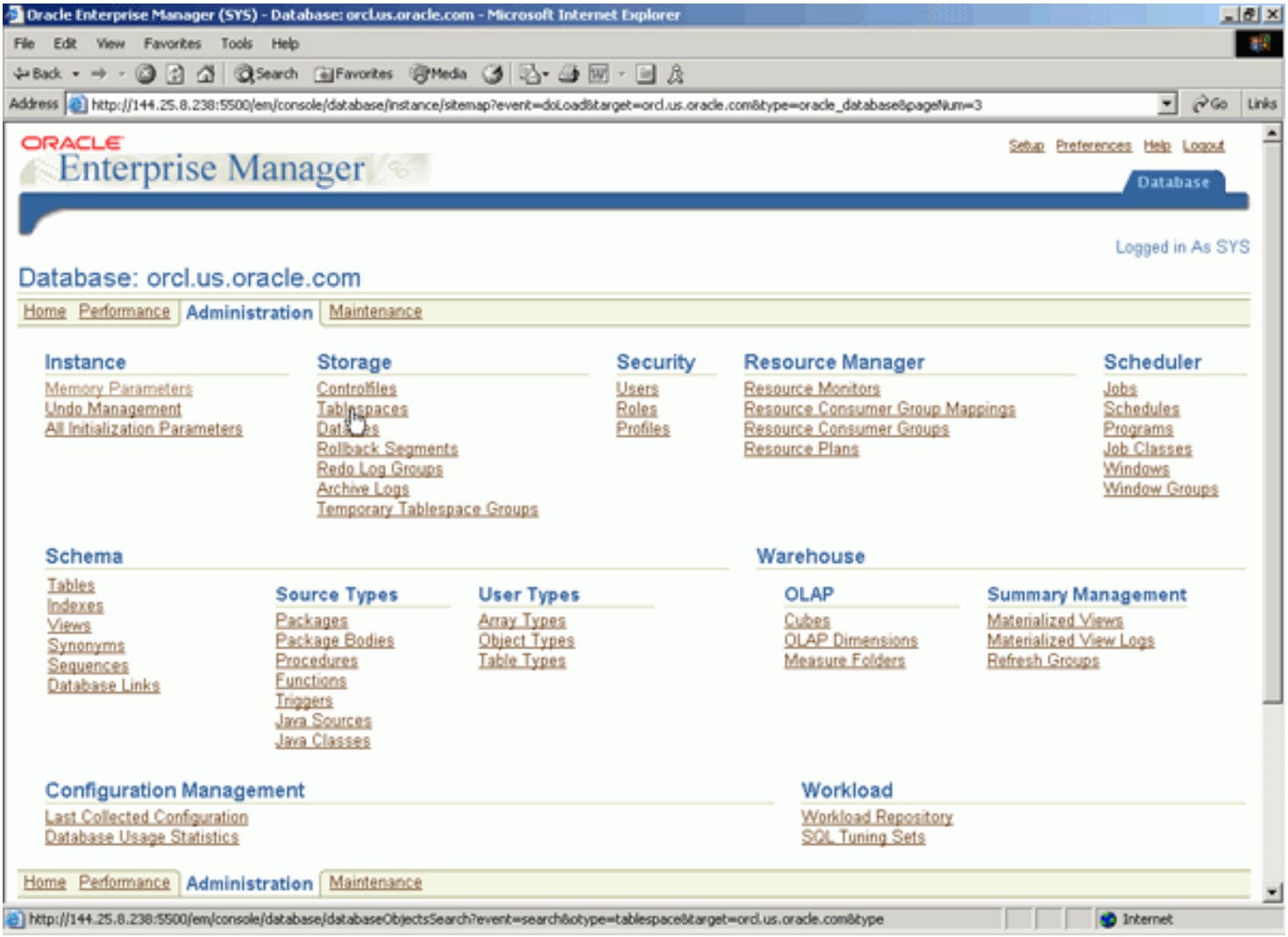
  Enter **sys/oracle** and specify **SYSDBA** then click **Login** .



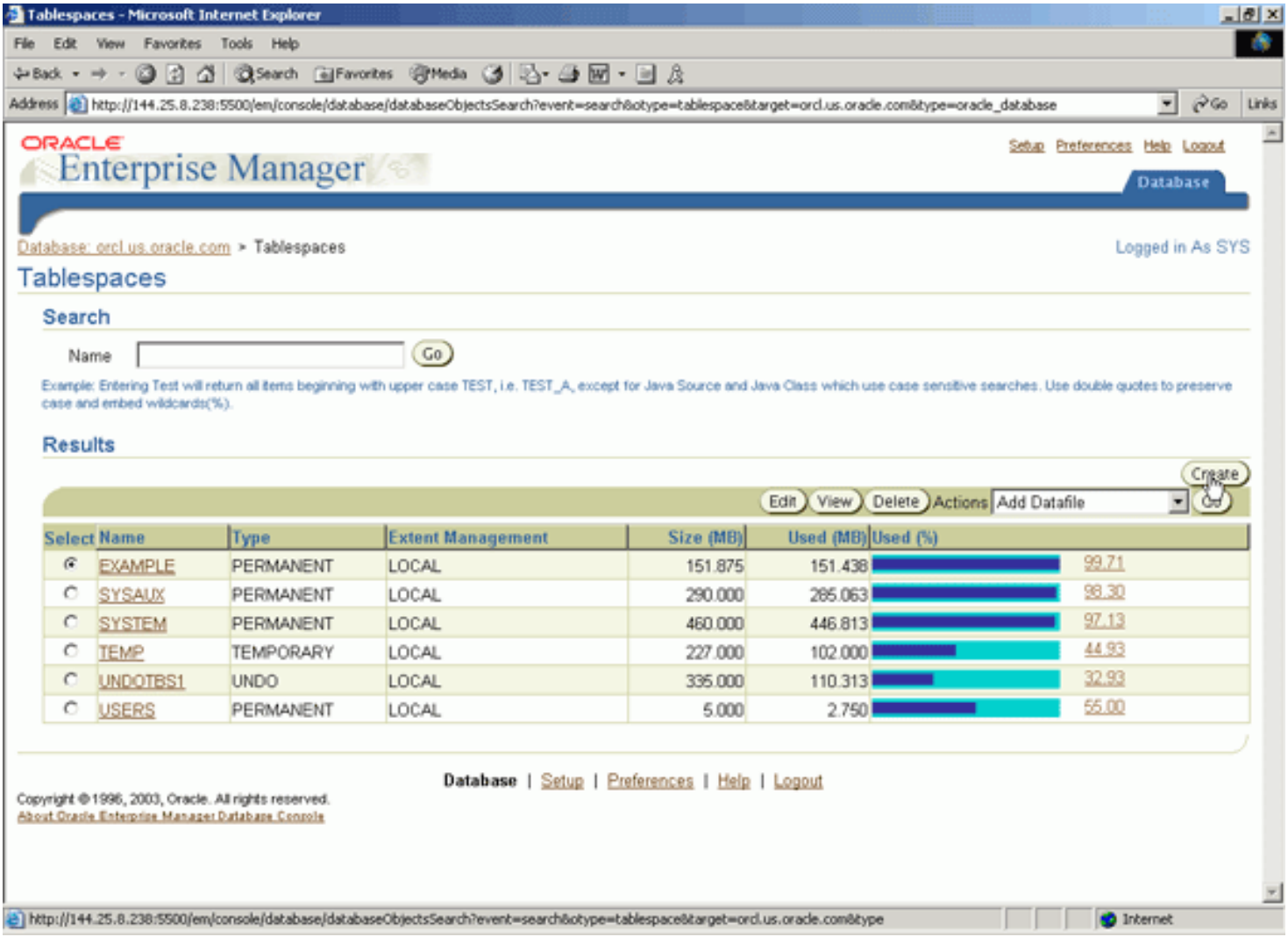
☐ **2.** Click on the **Administration** tab.



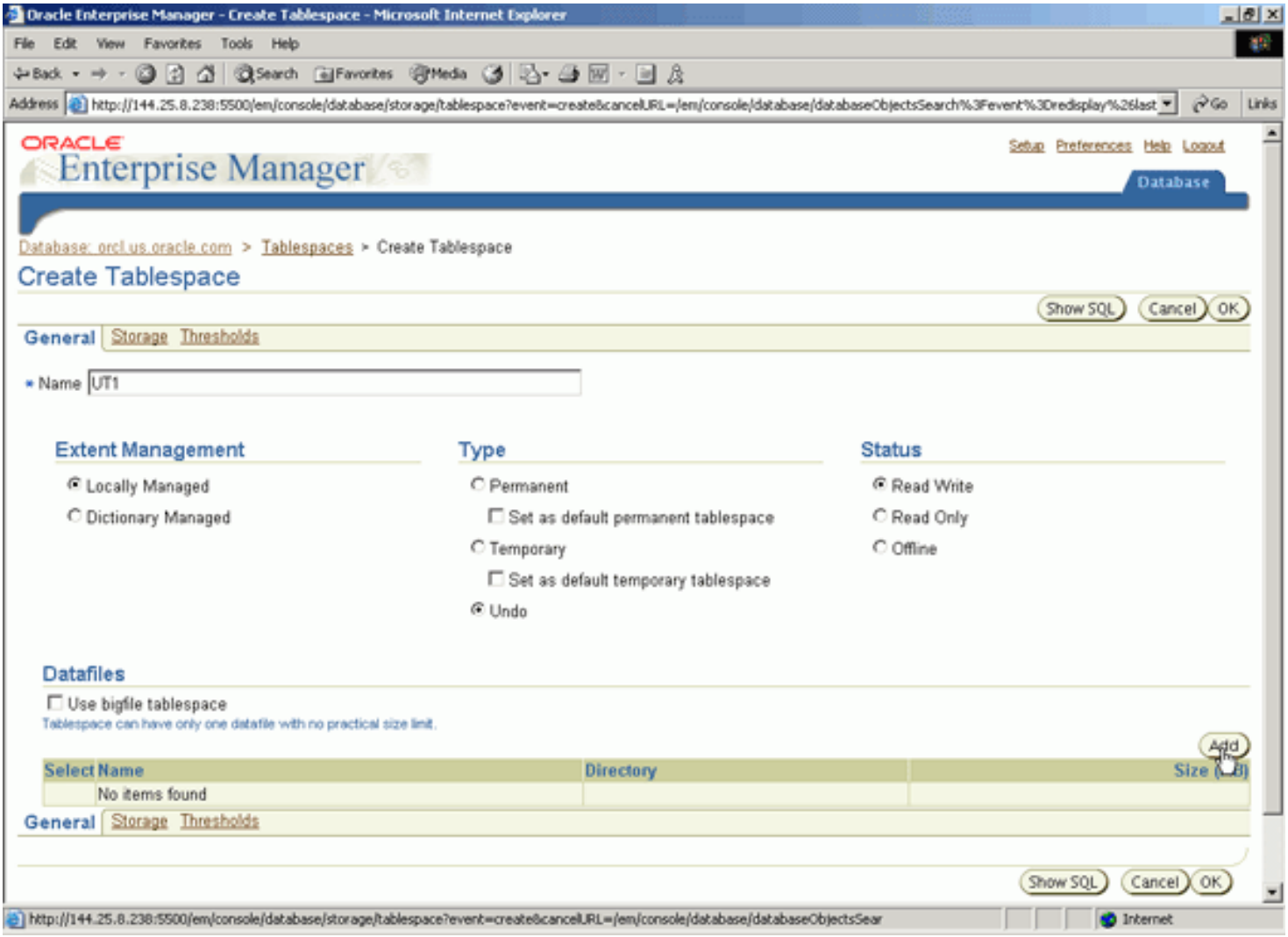
☐ **3.** Click on the **Tablespaces** link.



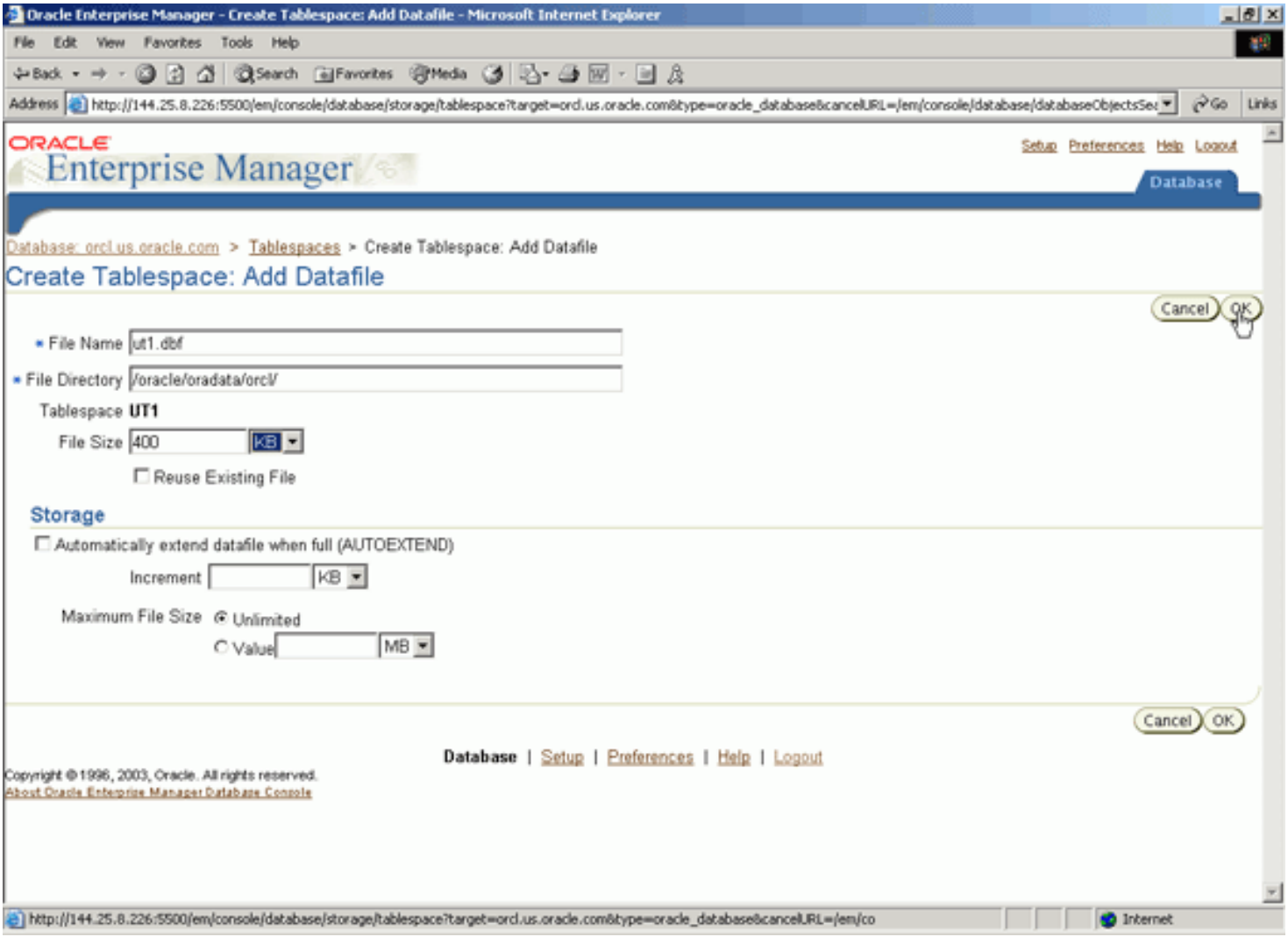
☐ **4.** Click **Create** .



☐ **5.** Enter **UT1** for the name, click on the Type **Undo** and click **Add** to add a datafile.



☐ **6.** Enter **ut1.dbf** for the filename and make sure **/oracle/oradata/orcl** is set for the file directory. Enter **400KB** for the file size and click **OK.**


Oracle Enterprise Manager - Create Tablespace: Add Datafile - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
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File Directory /oracle/oradata/orcl/
Tablespace UT1
File Size 400 KB
Reuse Existing File
Storage
Automatically extend datafile when full (AUTOEXTEND)
Increment KB
Maximum File Size Unlimited
Value MB
Cancel OK
Database | Setup | Preferences | Help | Logout
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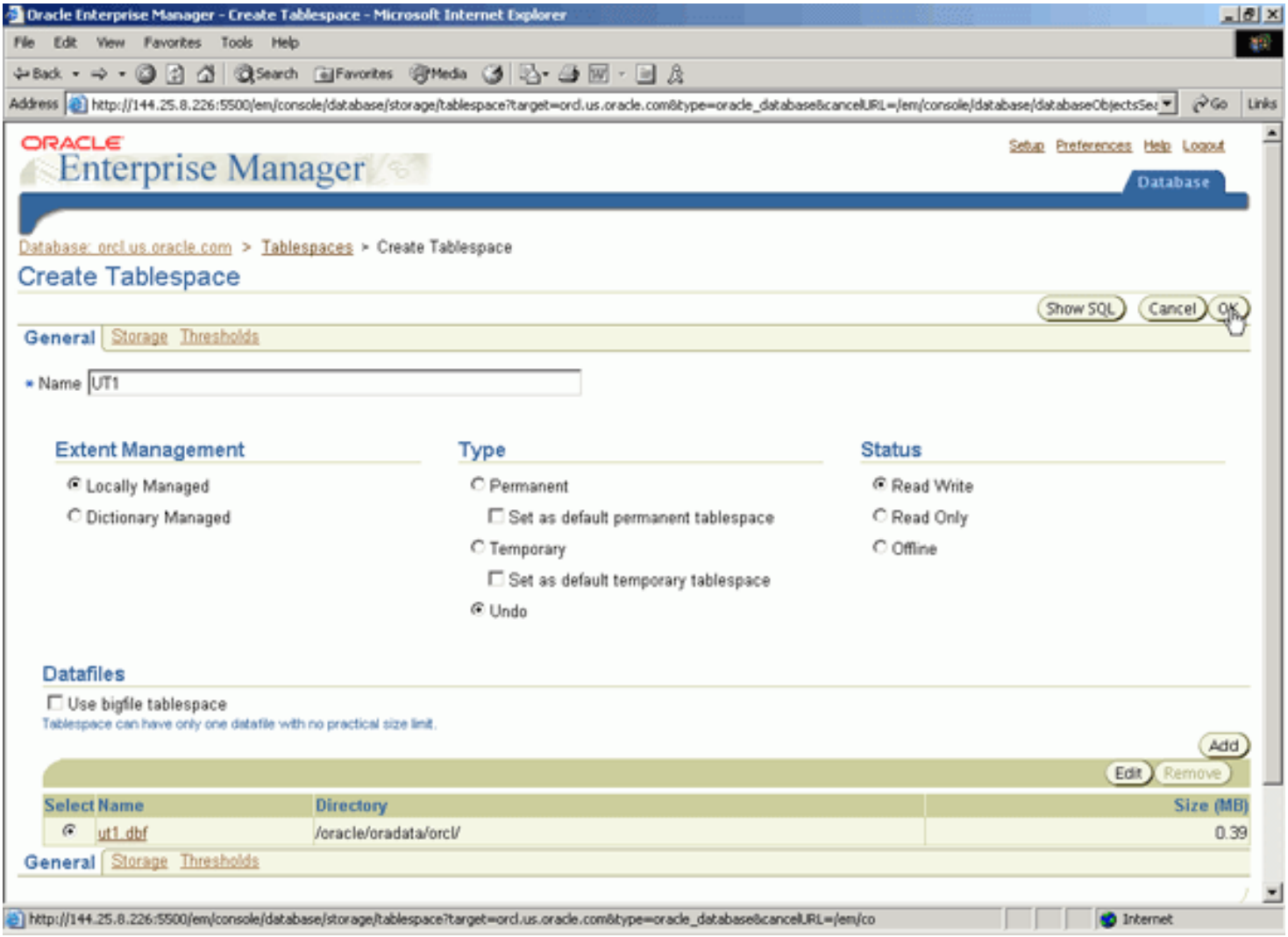
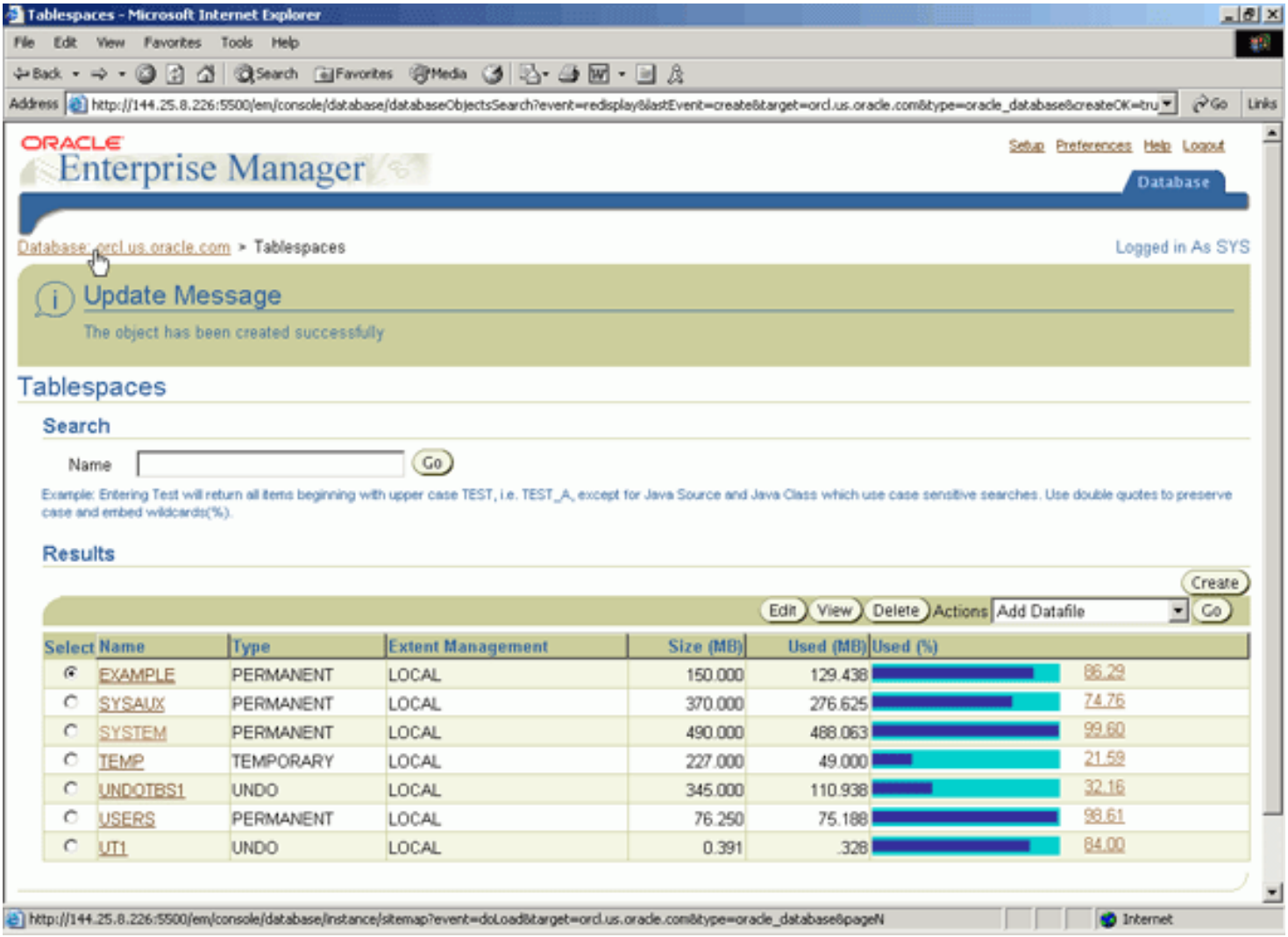
About Oracle Enterprise Manager Database Console
http://144.25.8.226:5500/em/console/database/storage/tablespace?target=orcl.us.oracle.com&type=oracle_database&cancelURL=/em/co
Internet

☐ **7.** Click **OK** .



☐ **8.** Your undo tablespace was created. Now you can enable undo retention tuning. Click your **Database** breadcrumb.



Enabling Automatic Undo Retention

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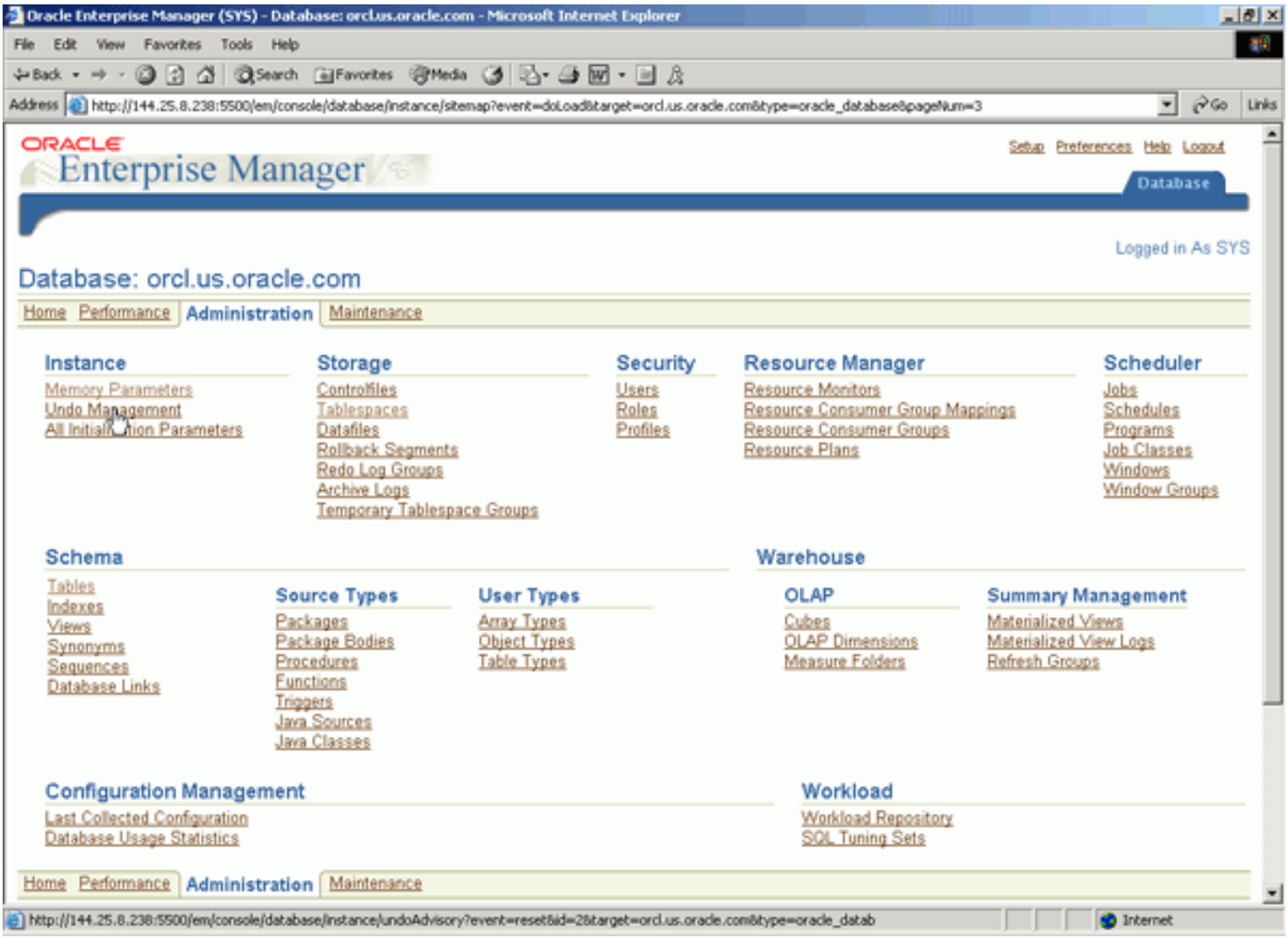
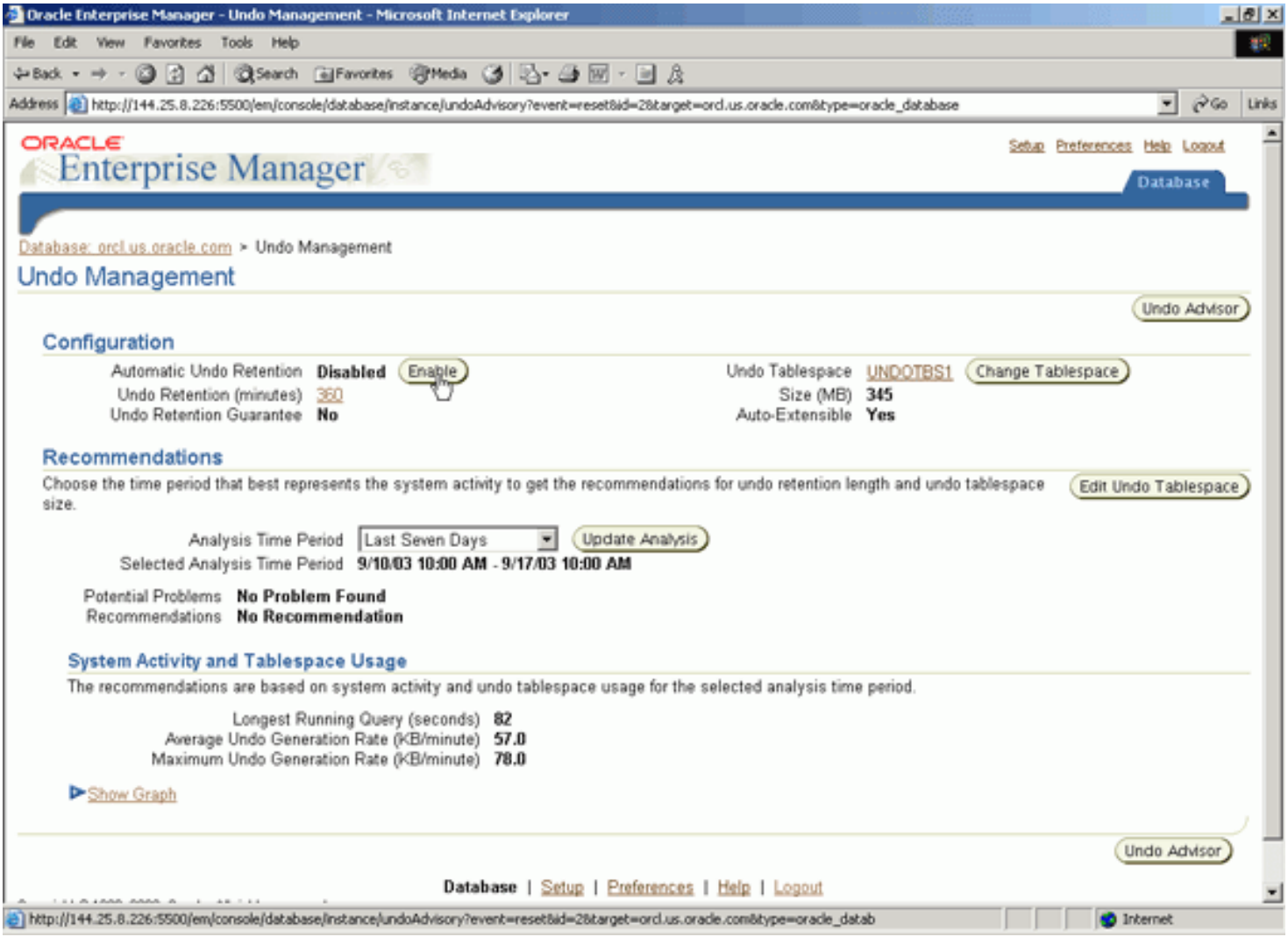
Now you can enable Automatic Undo Retention and use the tablepsace you just created. Perform the following:

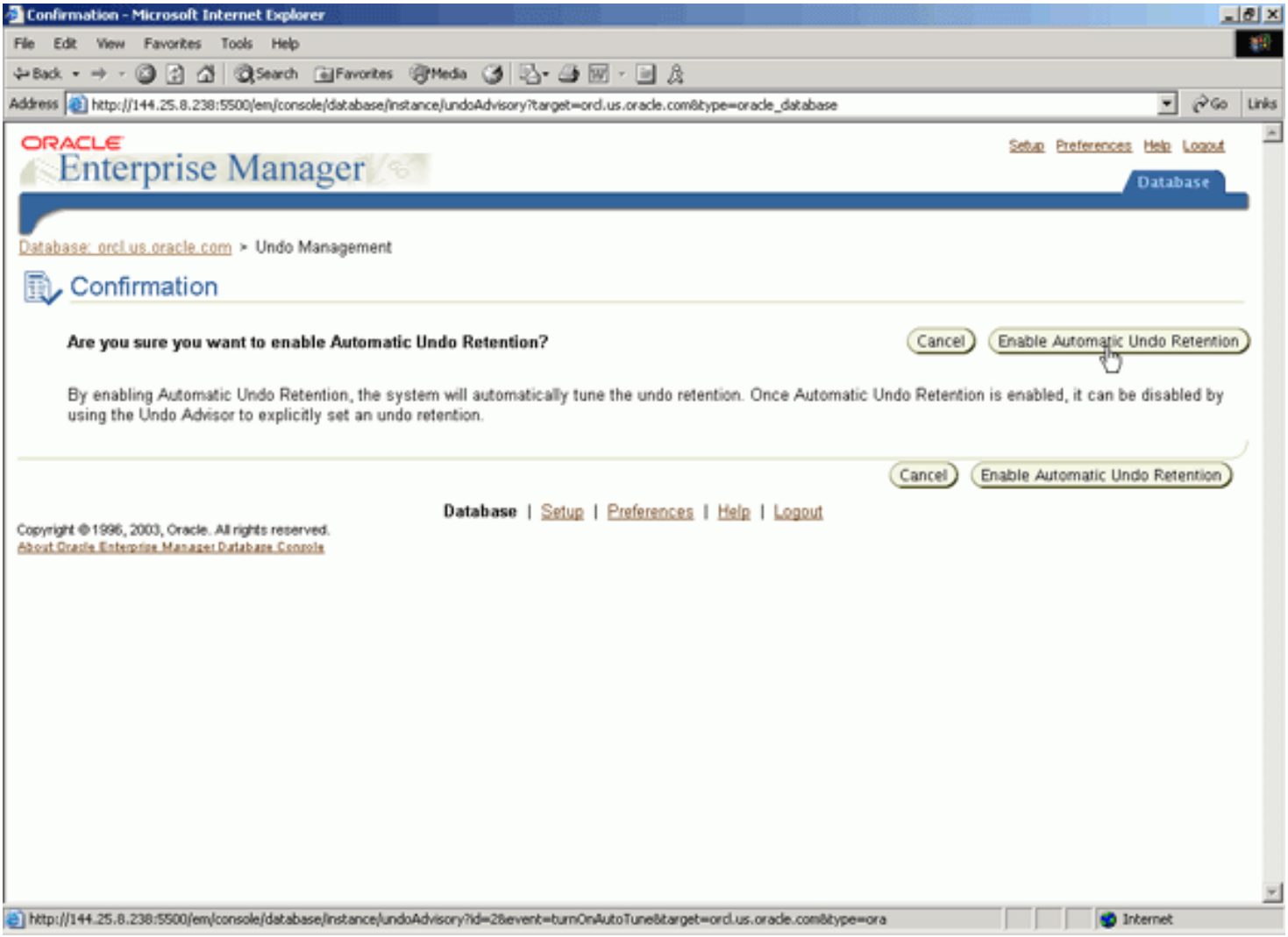
☐ **1.** Click on **Undo Management** .



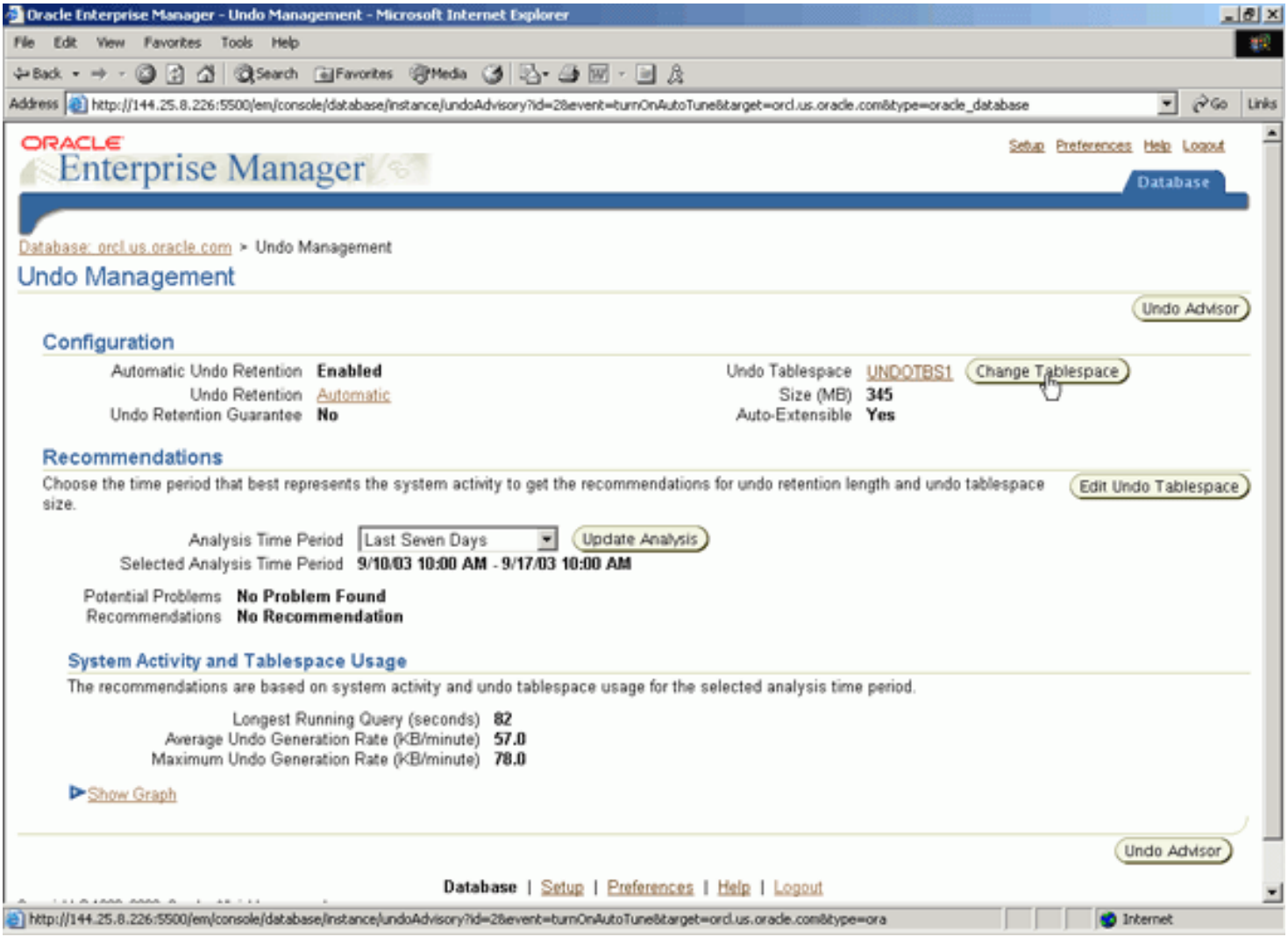
☐ **2.** Click **Enable** for Automatic Undo Retention.



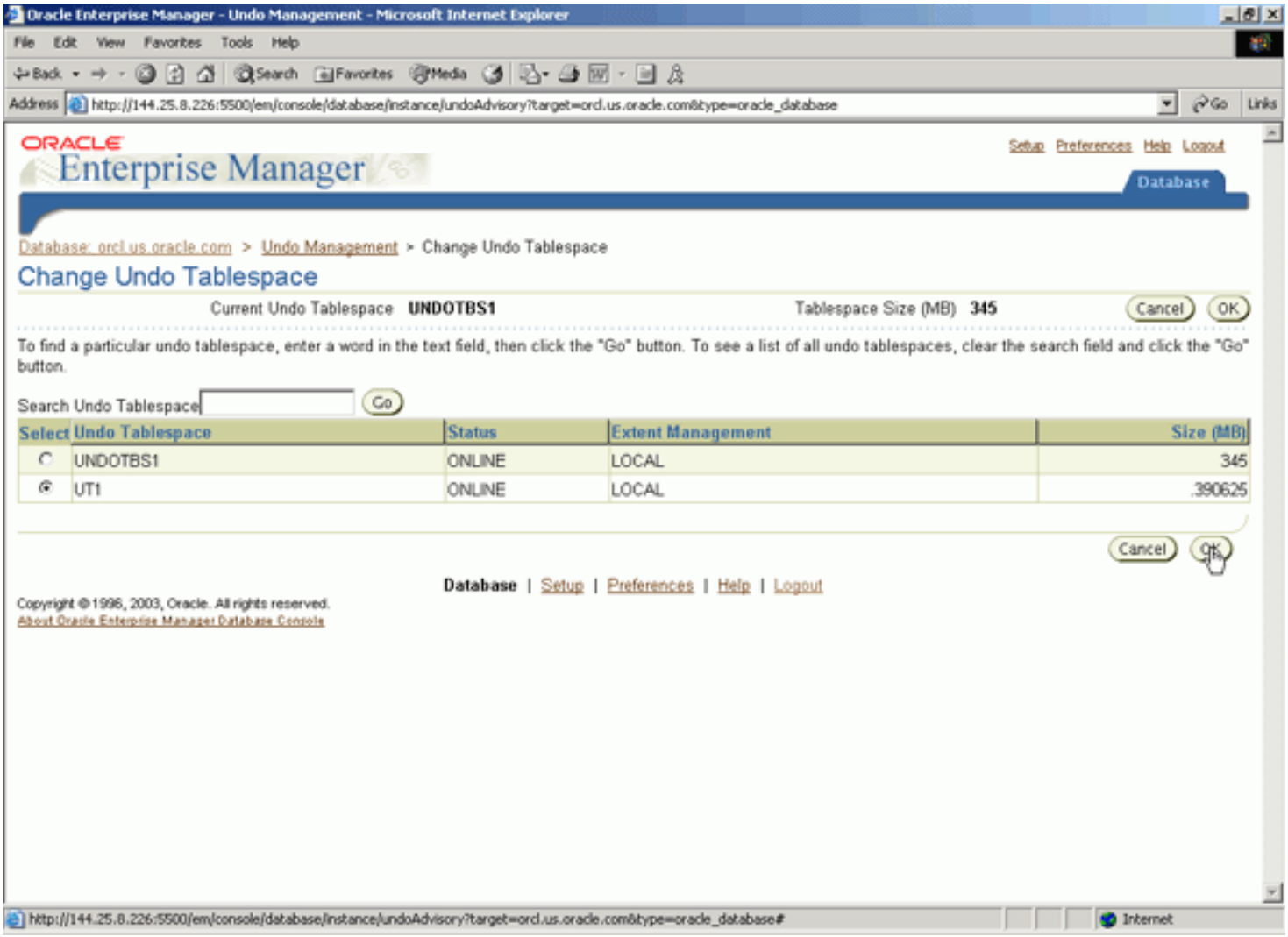
☐ **3.** Click **Enable Automatic Undo Retention** .



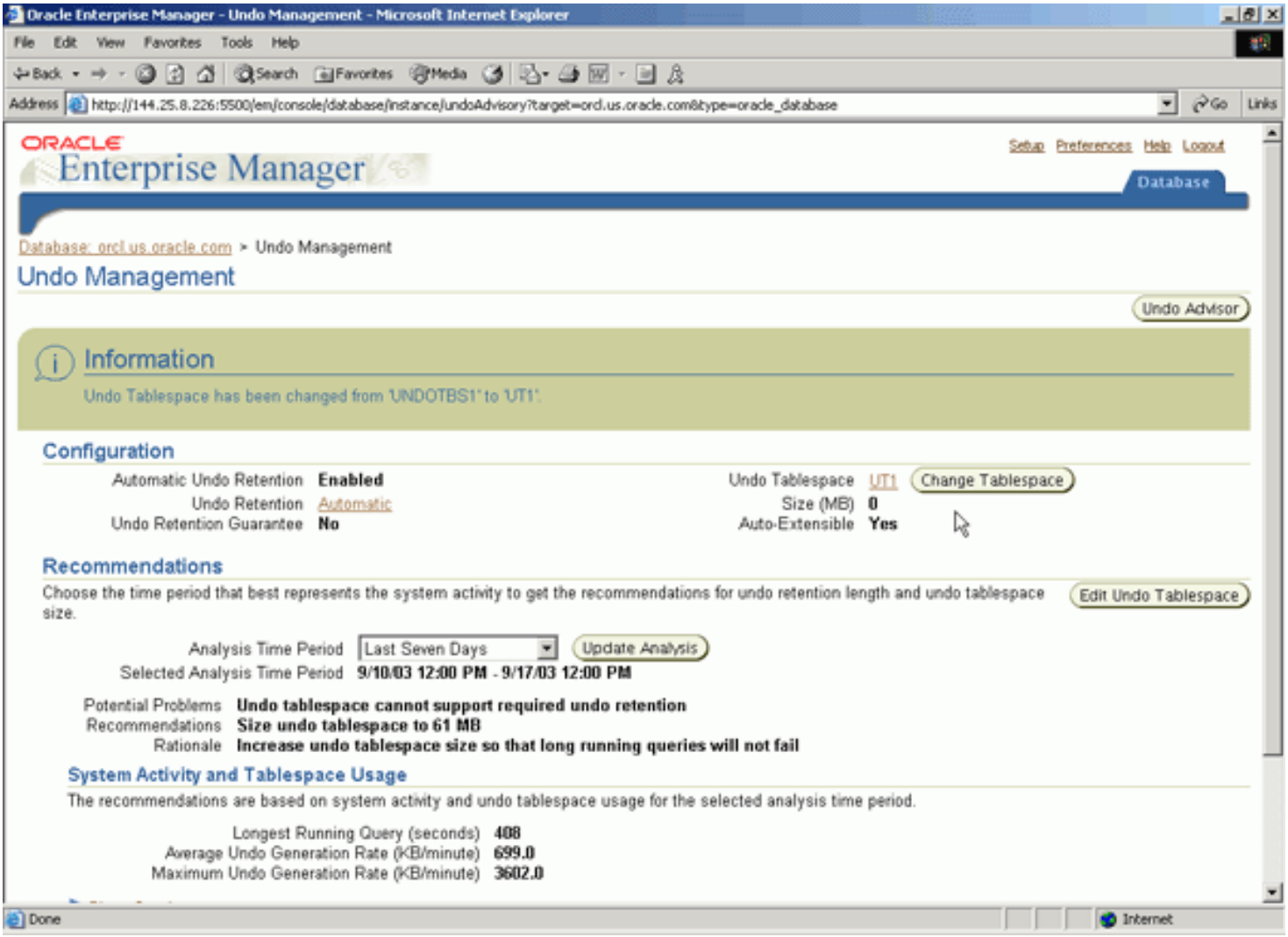
☐ **4.** Notice that Automatic Undo Retention is now enabled. Click **Change Tablespace** .



☐ **5.** Select the radio button next to **UT1** and click **OK** .



☐ **6.** The undo tablespace has been changed to the one you just created. Now you are ready to see how it works.



Generating Some Activity

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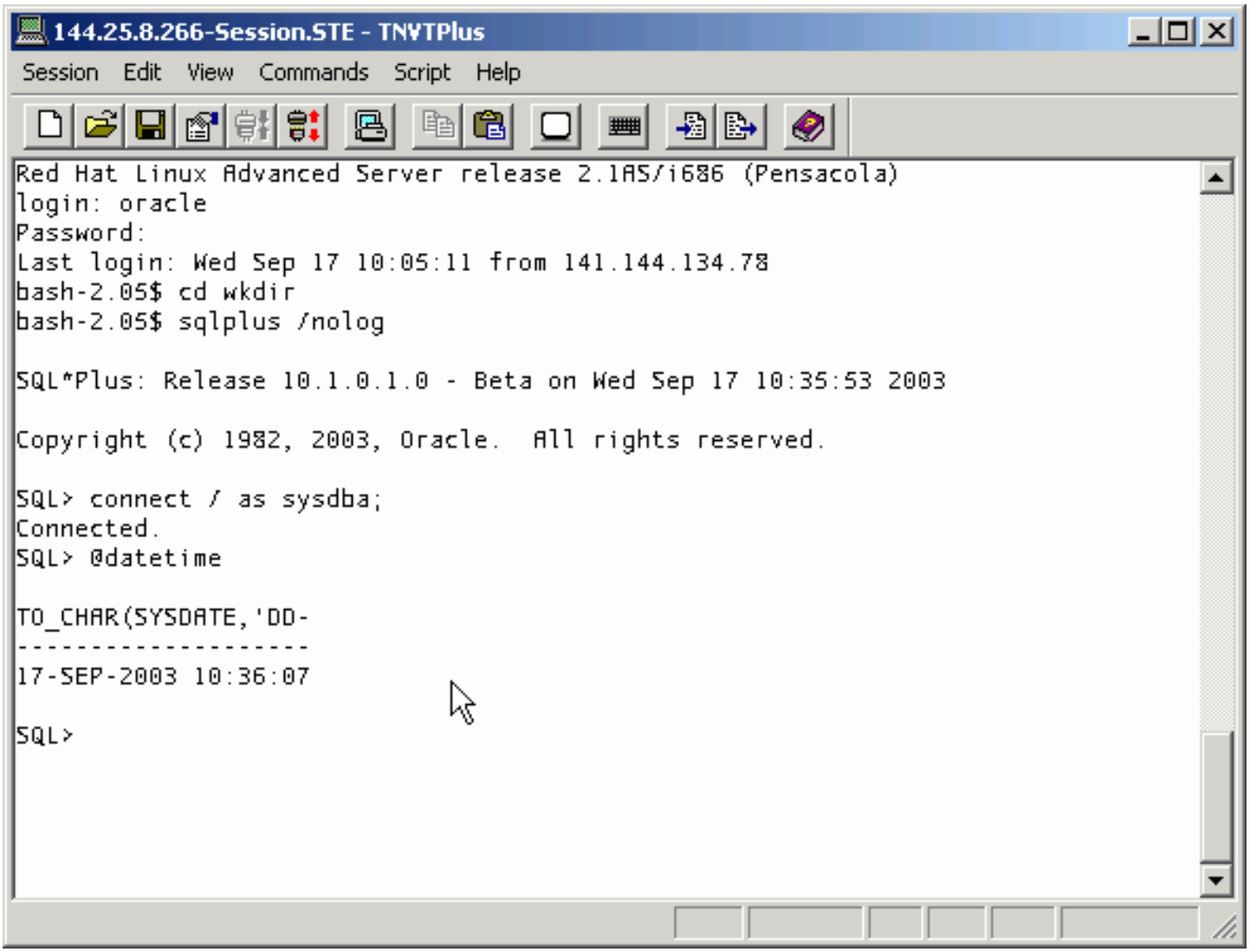
To see how undo management is handled, you need to generate some activity. Perform the following:

☐ **1.** You will first need to determine the date and time of your database. Open a terminal window and enter the following commands:

```
cd wkdir
sqlplus /nolog
connect / as sysdba;
@datetime
```

The **`datetime.sql`** script looks as follows:

```
select to_char(sysdate,'DD-MON-YYYY HH24:MI:SS')
 from dual;
```

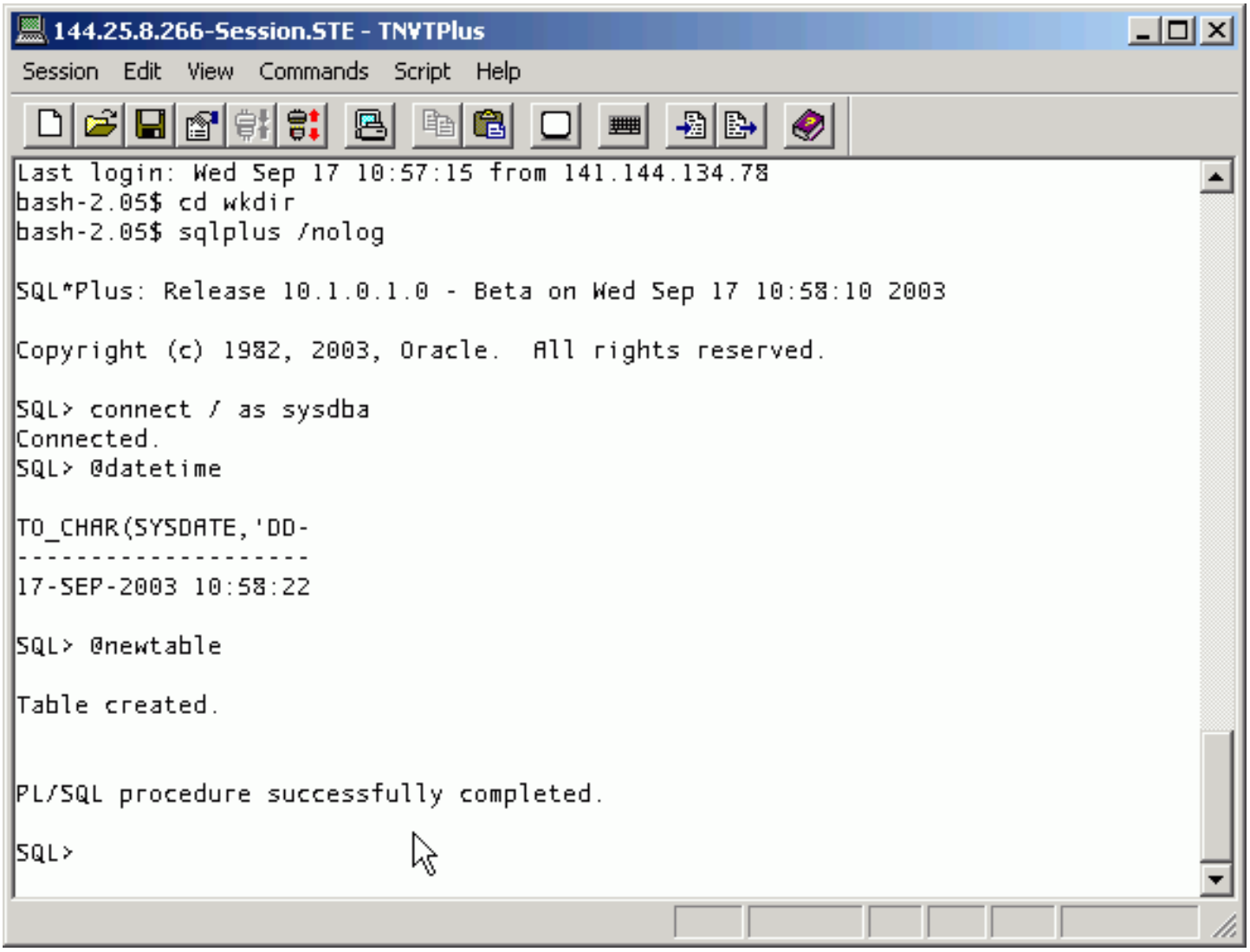


☐ **2.** From the same session, execute the following command:

```
@newtable
```

The **newtable.sql** script looks as follows:

```
create table newtable(b int, s varchar2(100));
begin
 for i in 1..100 loop
  insert into newtable values(i, rpad('s', 100));
 end loop;
 commit;
end;
/
```



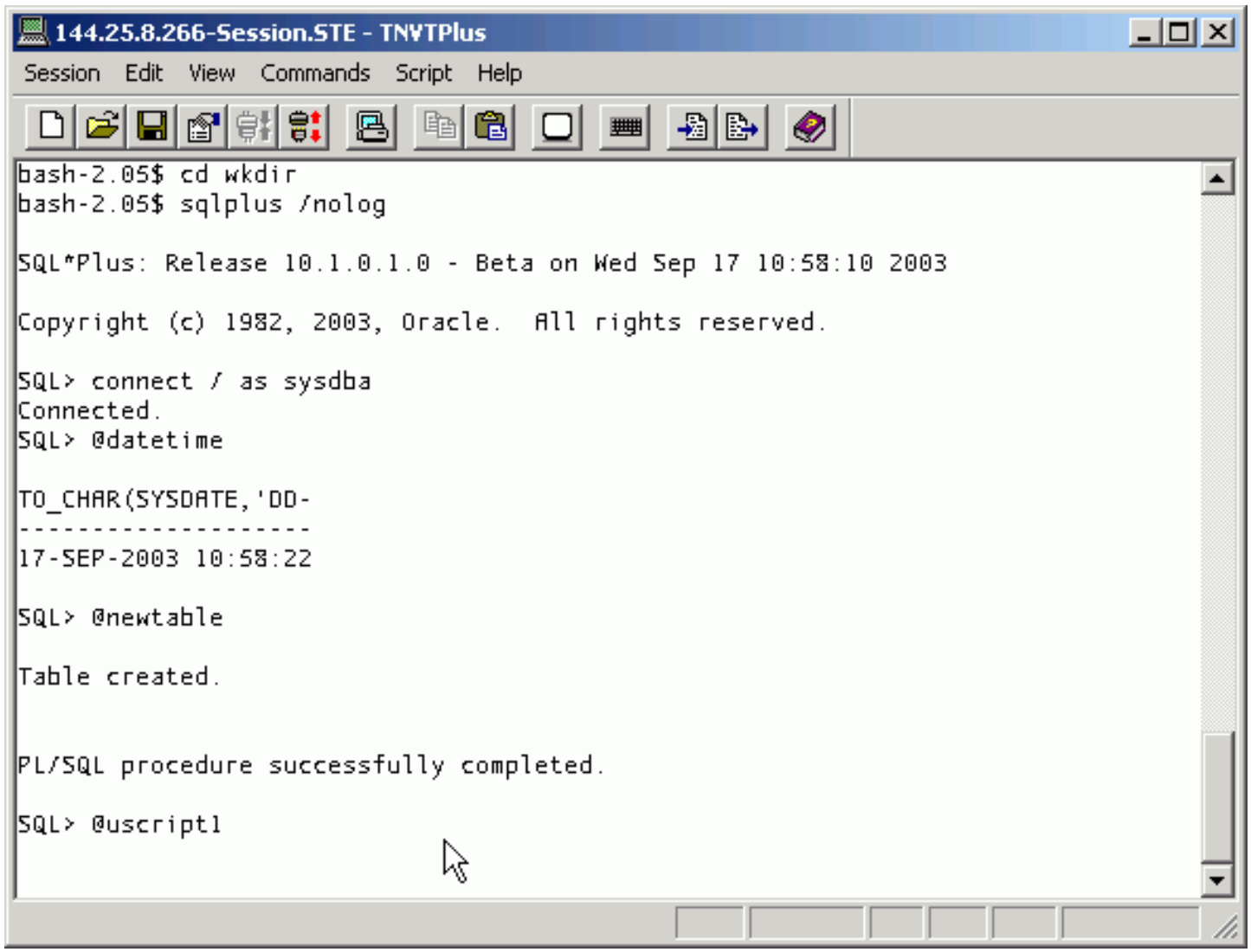
☐ **3.** From the first session, execute the following:

```
@uscript1
```

The **uscript1.sql** script looks as follows:

```
declare
b number;
cursor c1 is select b from newtable;
begin
```

```
 open c1;
 loop
  fetch c1 into b;
  dbms_lock.sleep(6);
  exit when c1%notfound;
 end loop;
 close c1;
 commit;
end;
/
```

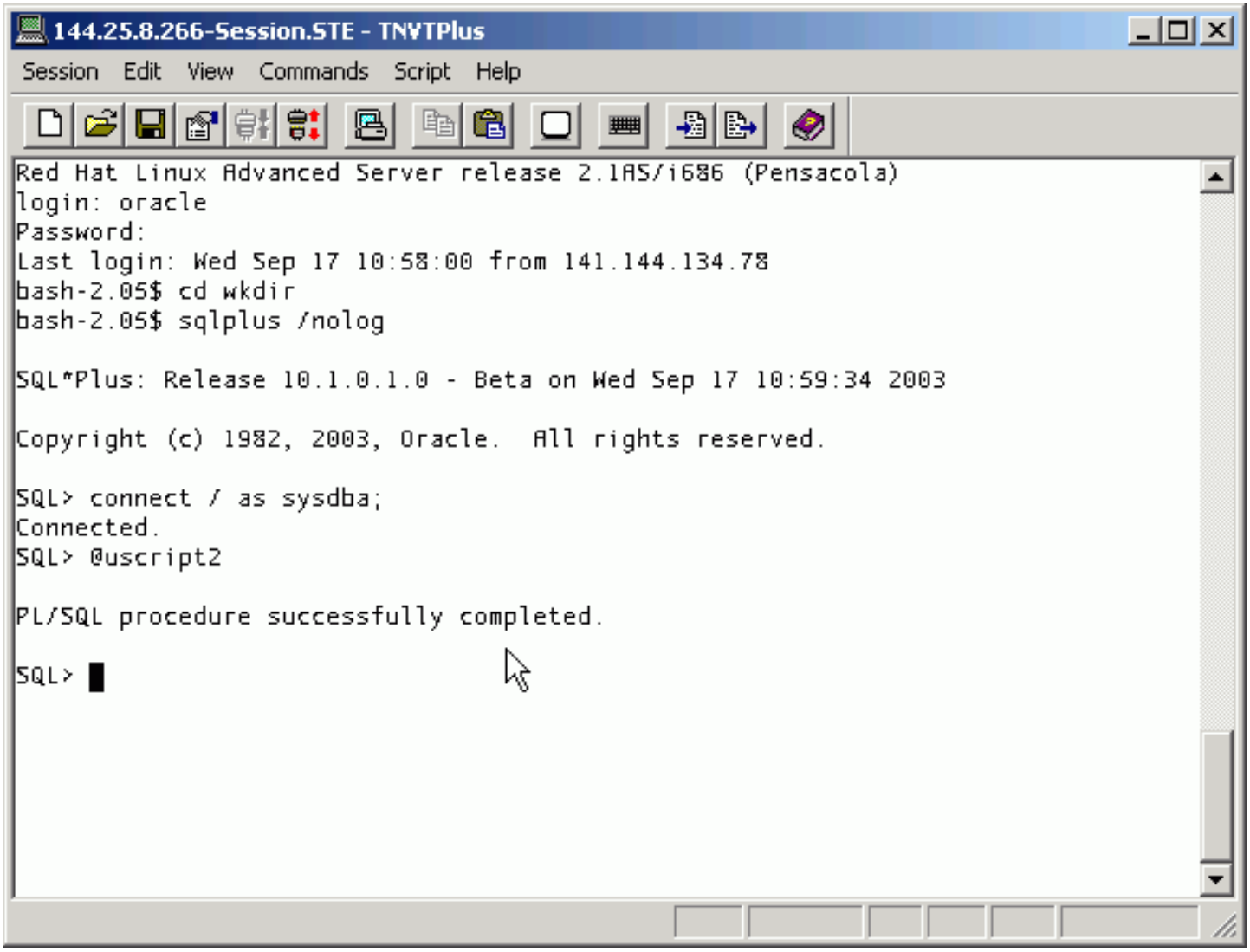


☐ **4.** Open another terminal window and execute the following commands:

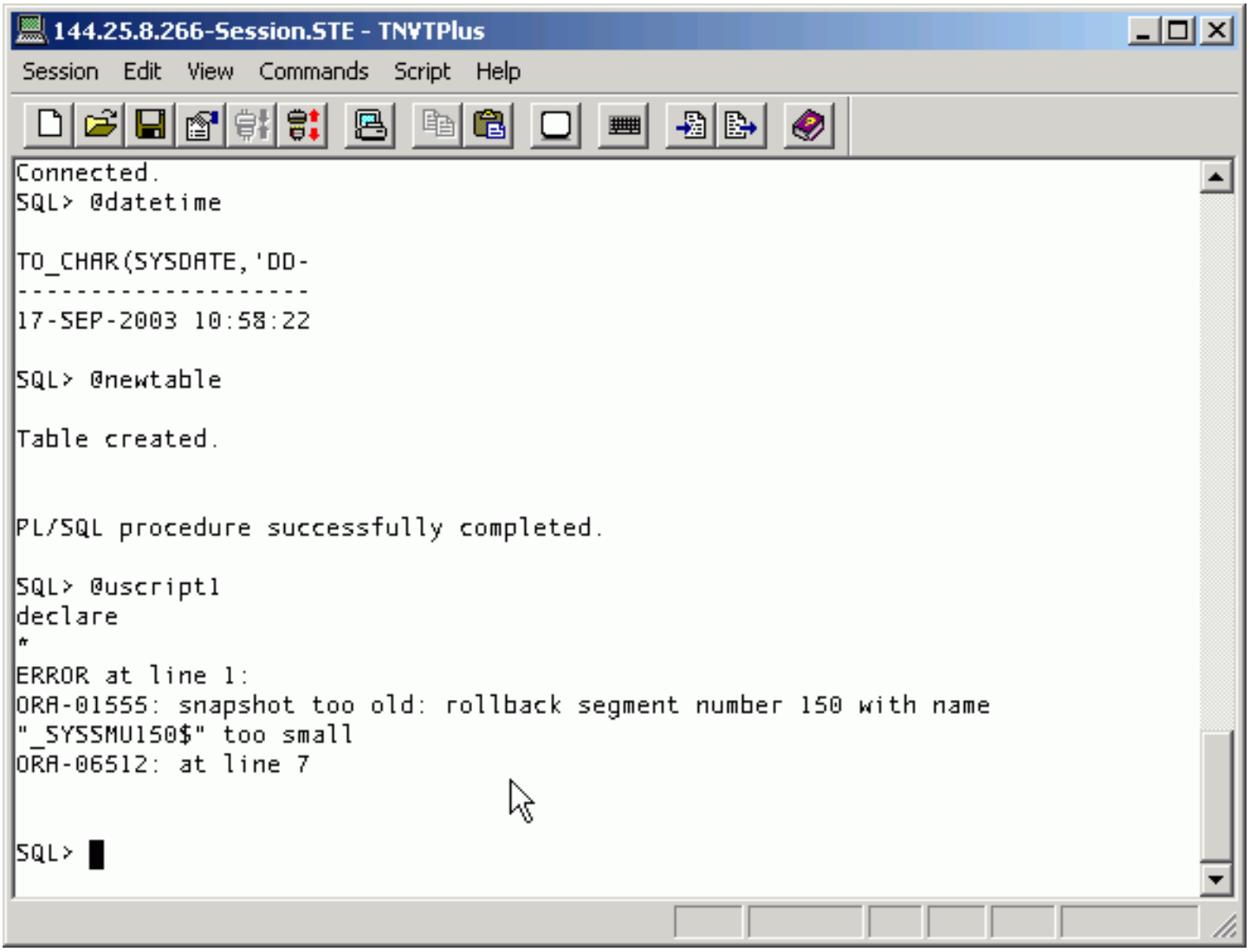
```
cd wkdir
sqlplus /nolog
connect / as sysdba
@uscript2
```

The **uscript2.sql** script looks as follows:

```
begin
 for i in 1..1000 loop
  update newtable set b=b+1, s=rpad('t', 100);
  commit;
 end loop;
end;
/
```



☐ **5.** Switch back to the first SQL*Plus session. Soon, you get a "Snapshot too old" error. Although you are using Automatic Undo Retention tuning, your undo tablespace is too small to accommodate the update script.



Reviewing Undo Advisor Recommendations

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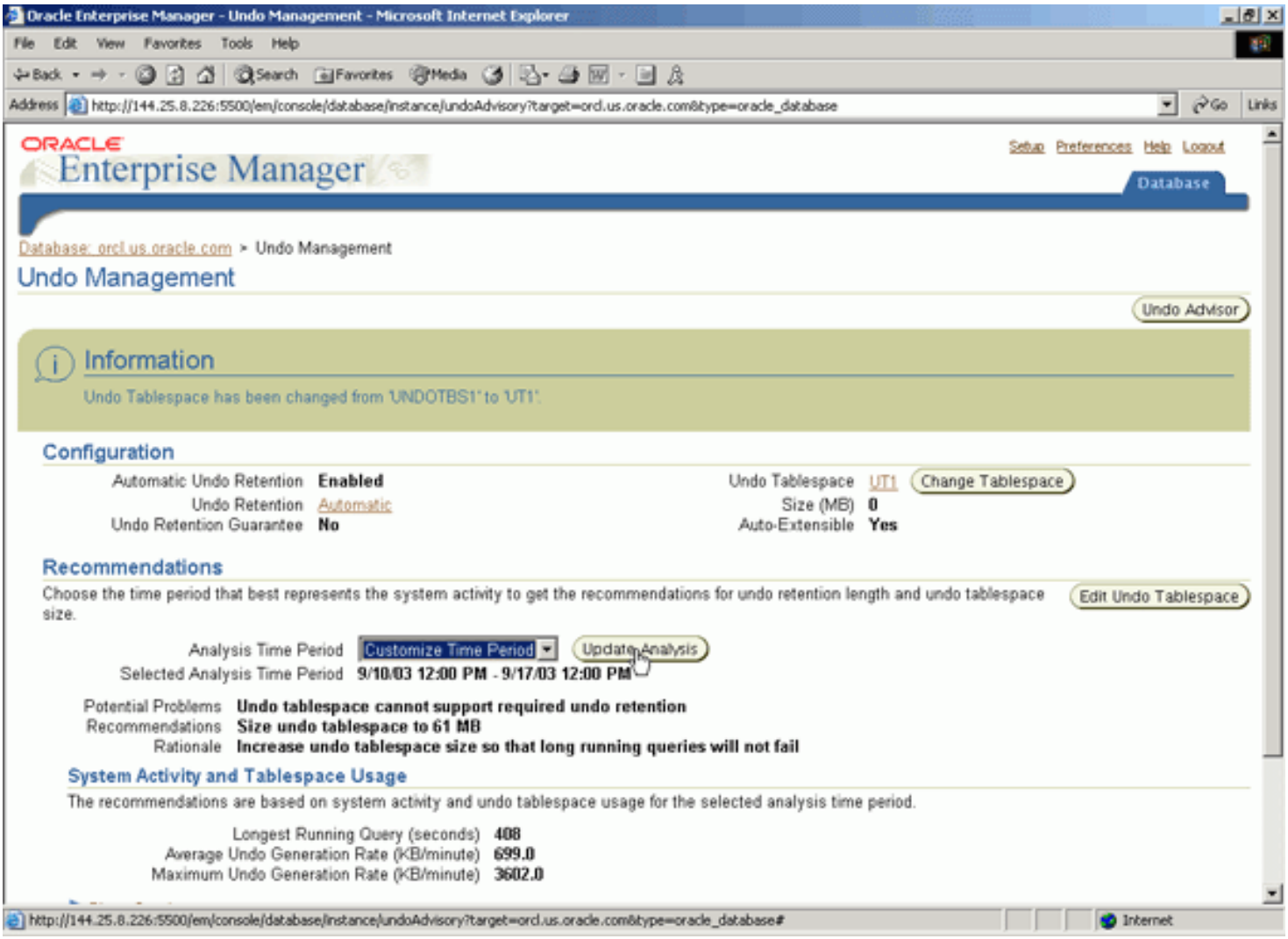
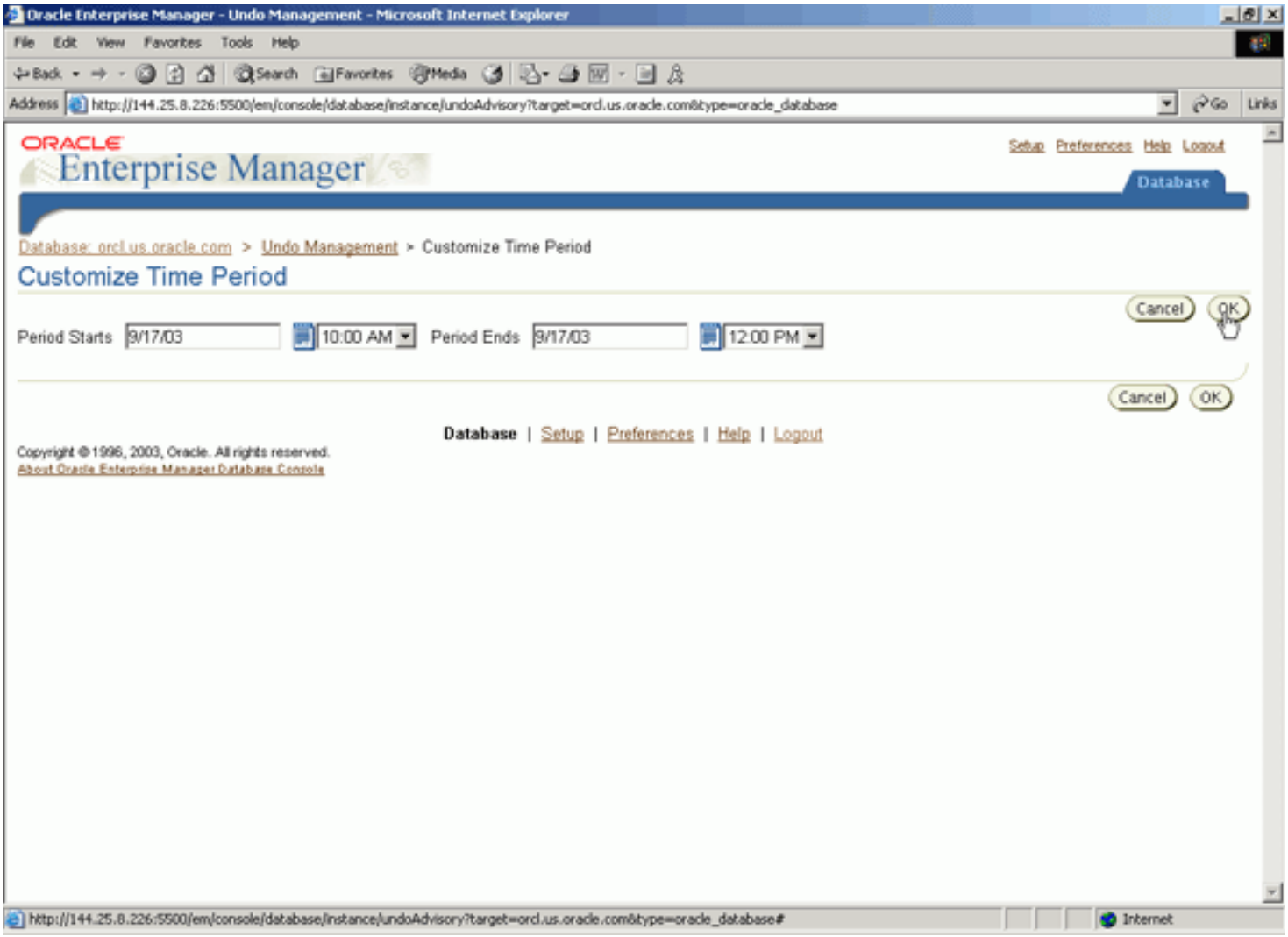
To review the recommendations that the undo advisor made, perform the following:

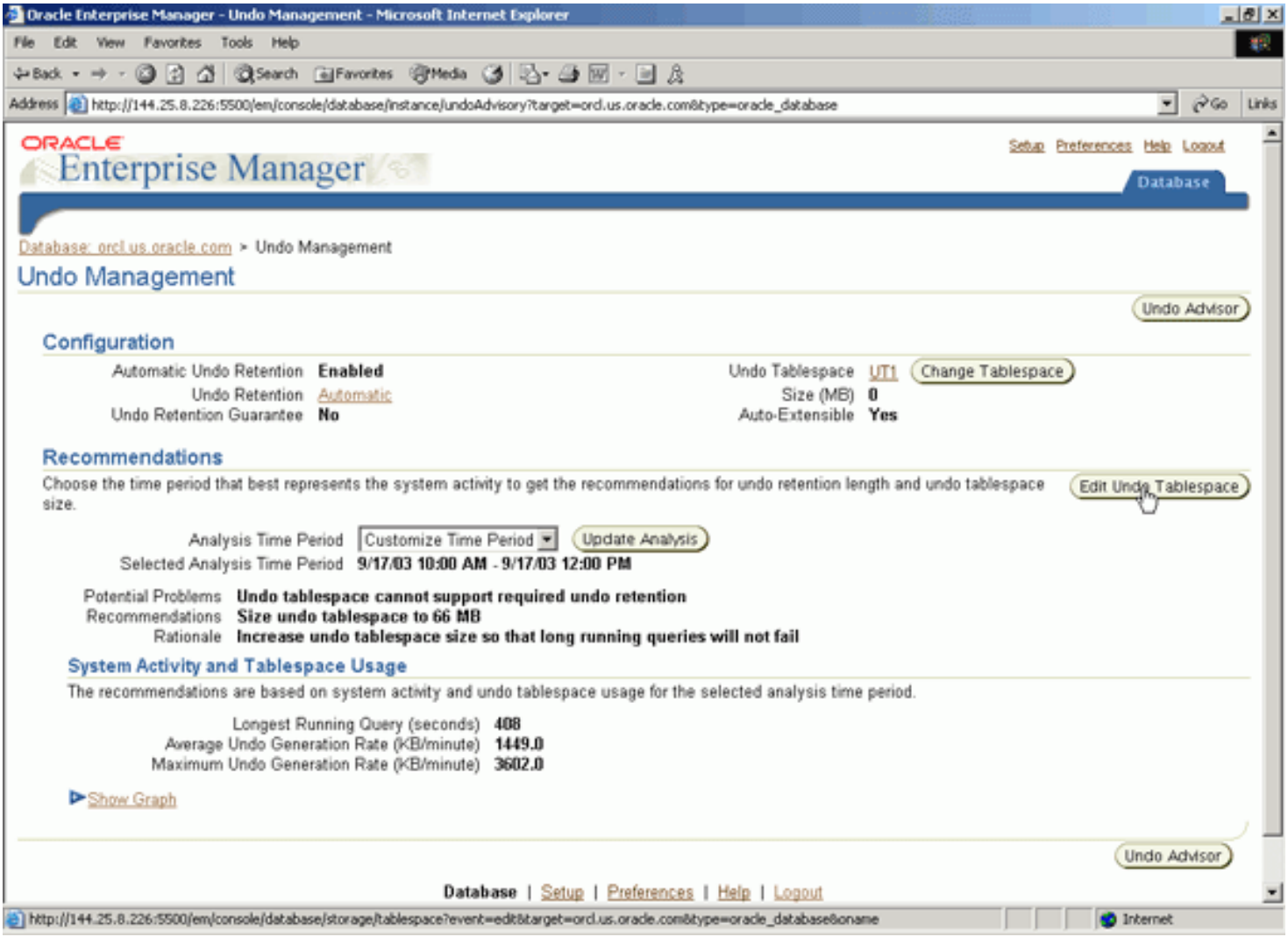
☐ **1.** Switch back to Enterprise Manager and look at the Undo Management page. Notice that the current recommendation (61MB) is because the default analysis is for the past seven days. Since you want to analyze a particular workload, and not what had happened before you will need to customize the time period. Select the **Customized Time Period** for the Analysis Time Period and click **Update Analysis** .



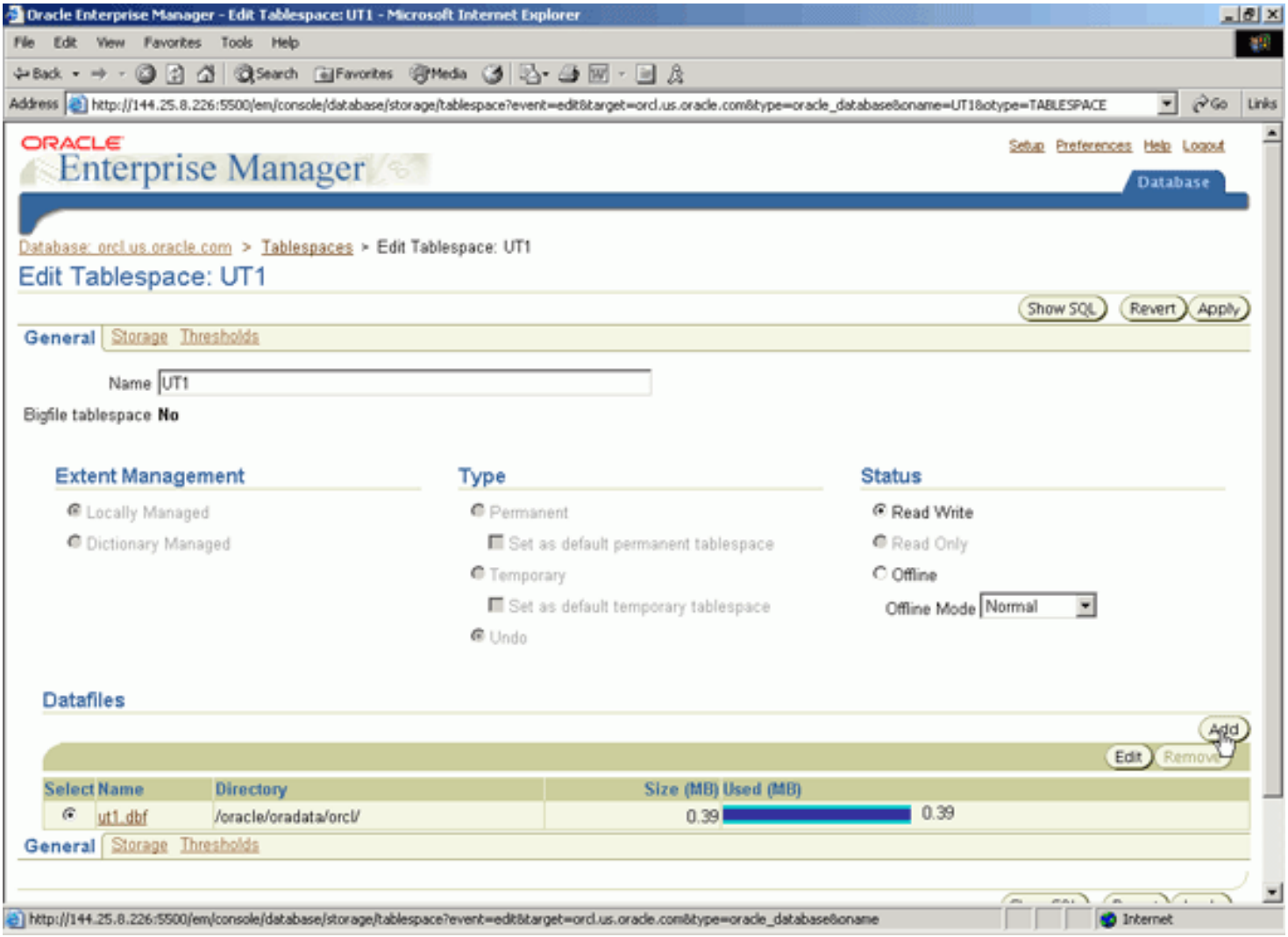
☐ **2.** Use the date and time you determined previously for the Period Starts field. For the Period Ends field, use the same value plus two hours. Once done, press the **OK** button.



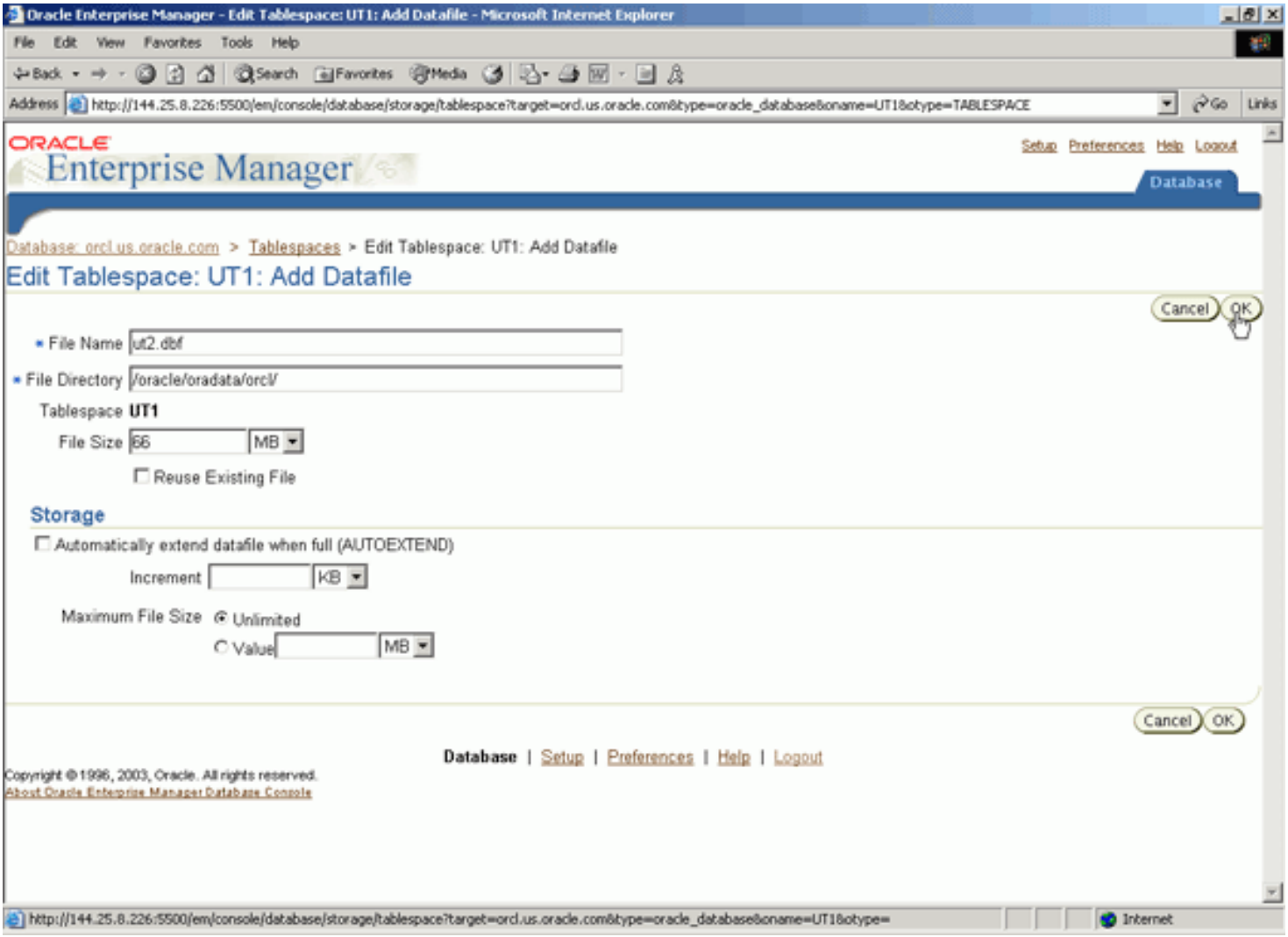
☐ **3.** You want perform the recommendation and raise the size of your undo tablespace. Click **Edit Undo Tablespace** .



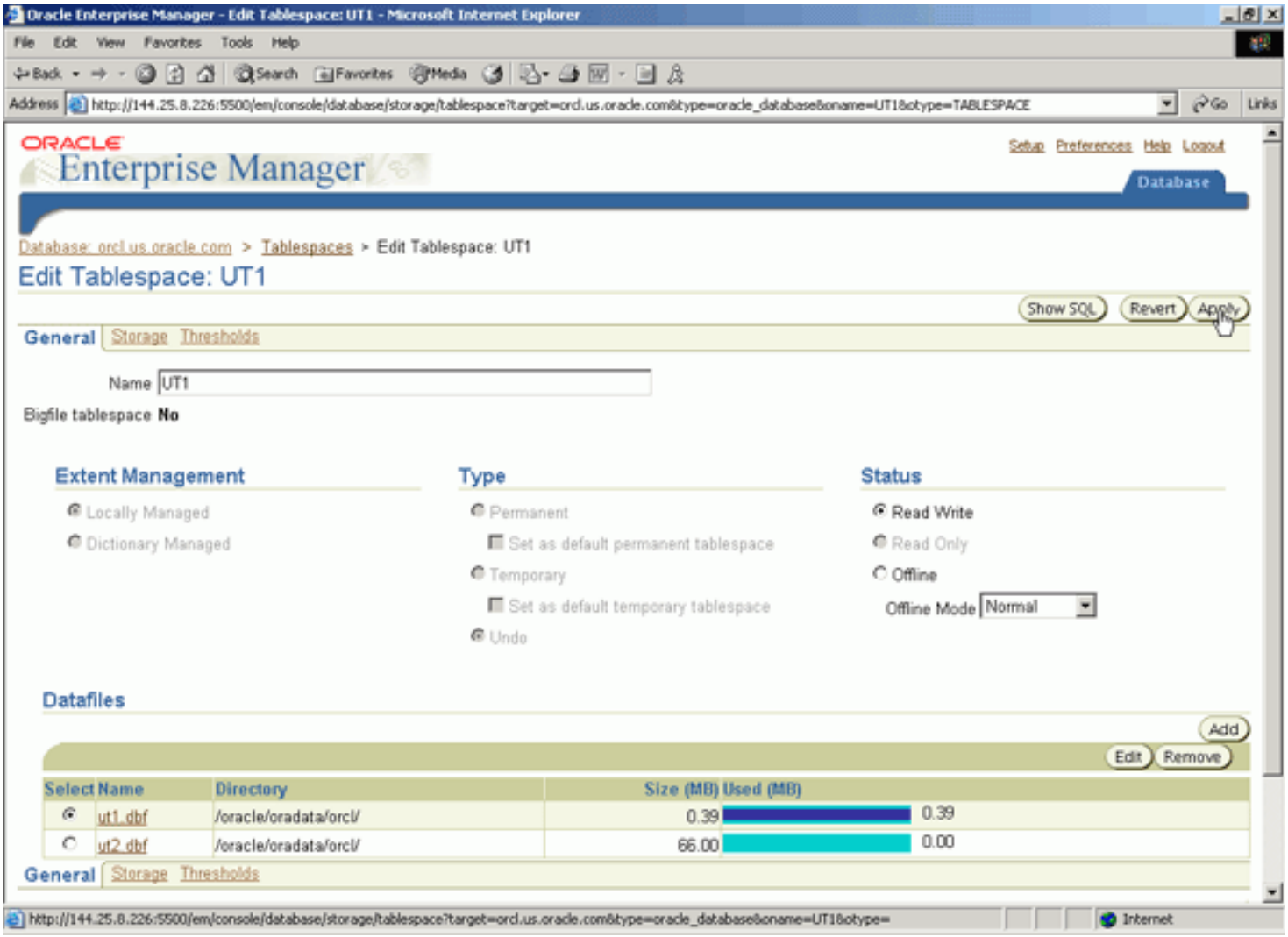
☐ **4.** Click **Add** to add a datafile.



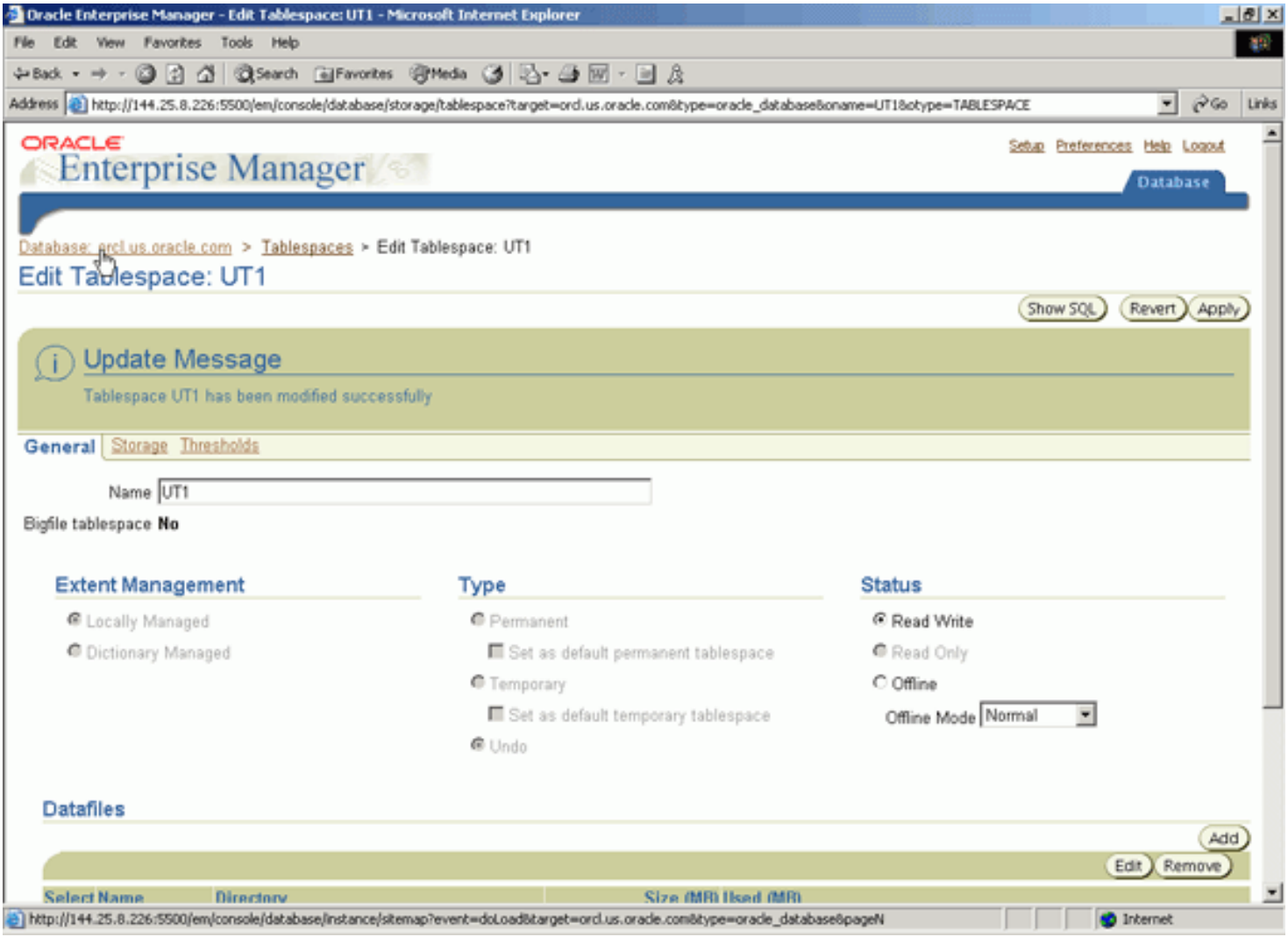
☐ **5.** Enter **ut2.dbf** as the filename and specify whatever the recommendation should be. Then click **OK** .



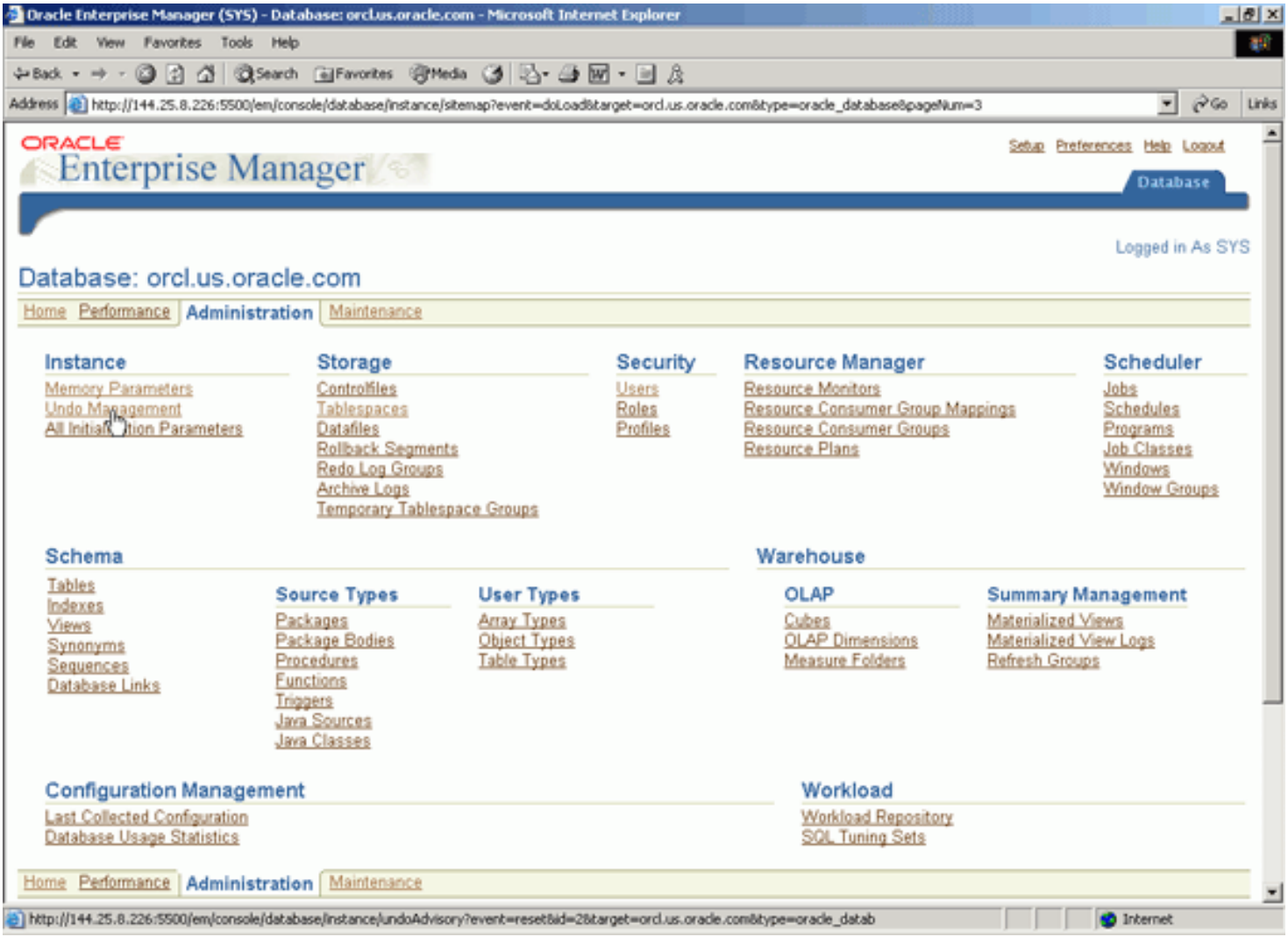
☐ **6.** Click **Apply** .



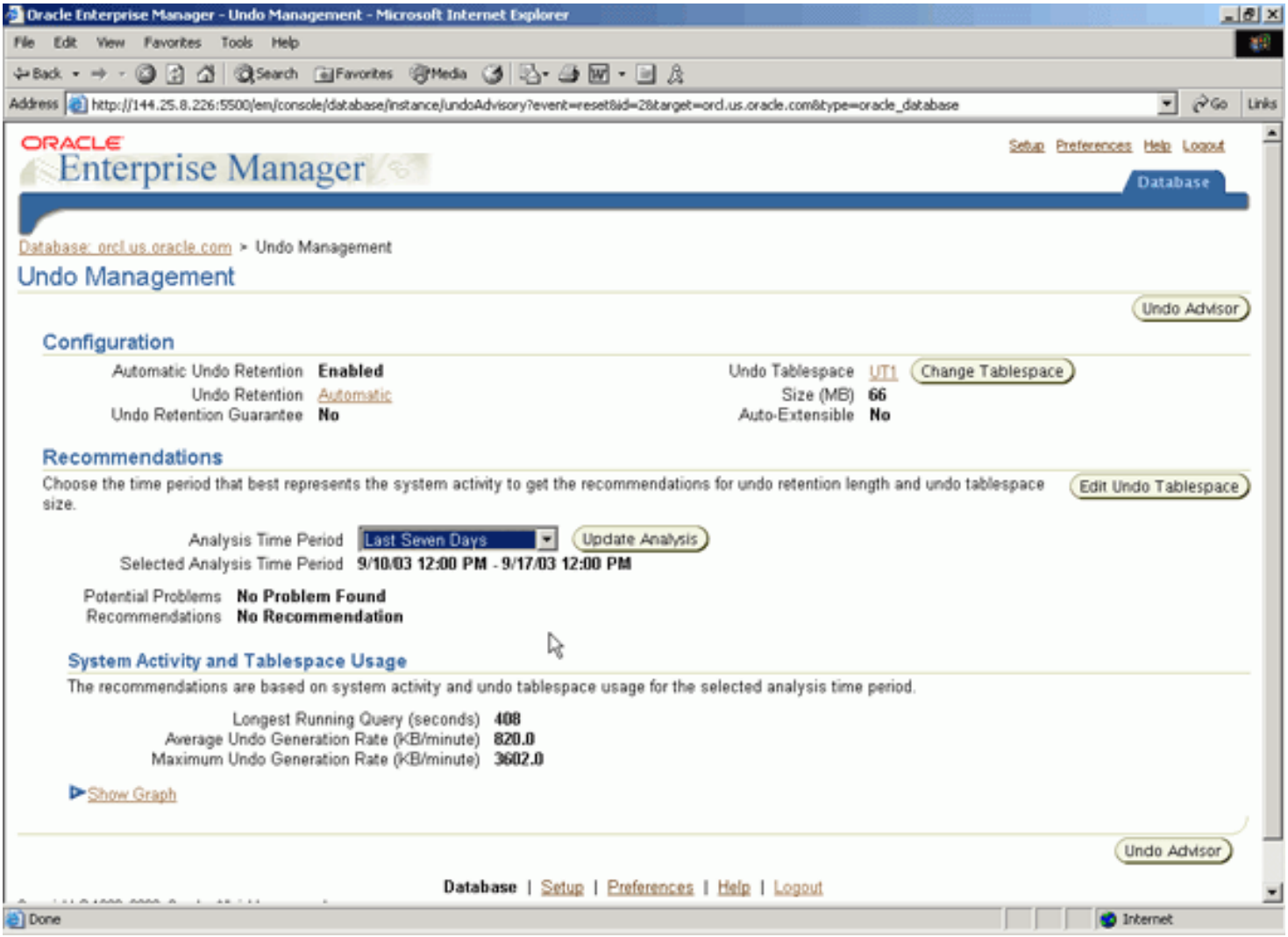
☐ **7.** Select your **Database** breadcrumb.



☐ **8.** Select **Undo Management** .



☐ **9.** Notice that there are no problems or recommendations any longer. You may try running the uscript1 and uscript2 again to make sure the size of your tablespace is appropriate.


Oracle Enterprise Manager - Undo Management - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://144.25.8.226:5500/em/console/database/instance/undoAdvisory?event=reset&id=2&target=orcl.us.oracle.com&type=oracle_database
Go Links
ORACLE
Enterprise Manager
Setup Preferences Help Logout
Database
Database: orcl.us.oracle.com > Undo Management
Undo Management
Undo Advisor
Configuration
Automatic Undo Retention Enabled
Undo Retention Automatic
Undo Retention Guarantee No
Undo Tablespace UT1 Change Tablespace
Size (MB) 66
Auto-Extensible No
Recommendations
Choose the time period that best represents the system activity to get the recommendations for undo retention length and undo tablespace size.
Edit Undo Tablespace
Analysis Time Period Last Seven Days Update Analysis
Selected Analysis Time Period 9/10/03 12:00 PM - 9/17/03 12:00 PM
Potential Problems No Problem Found
Recommendations No Recommendation
System Activity and Tablespace Usage
The recommendations are based on system activity and undo tablespace usage for the selected analysis time period.
Longest Running Query (seconds) 408
Average Undo Generation Rate (KB/minute) 820.0
Maximum Undo Generation Rate (KB/minute) 3602.0
Show Graph
Undo Advisor
Database | Setup | Preferences | Help | Logout
Done
Internet