Practice 5

Practice Installing and Using Swingbench 2.5

Practice Overview

The target of this practice is to install Swingbench 2.5 on your hosting PC. In high level, you will perform the following:

- Download and install Oracle client software on your hosting PC
- Configure `tnsnames.ora` file in the hosting PC
- Install Swingbench 2.5
- Set up Order Entry schema (the one shipped with Swingbench)
- Get familiar with Swingbench

About Swingbench

Swingbench is a free Java-based load generator tool (and benchmarks) developed by Dominic Giles and it is designed to stress test an Oracle database.

Note: there is a few stress testing products on the market. Swingbench is the one that will be used in the course practice.

Note: this is not to learn about all the Swingbench capabilities. You will use it to the limit needed for the course practices.

Practice Assumptions

- The practice assumes that you have the Oracle RAC database up and running in the virtual machines `srv1` and `srv2`.
- This practice assumes that you have Java 1.8 installed in your hosting PC. To know which version of Java runtime is installed in your PC, issue the following command in the command prompt:

```
java -version
```

Practice Procedures

A. Install and configure Oracle Client Software

In this section of the practice, you will install Oracle client on the hosting PC.

1. Download "Oracle Database Client (12.1.0.2.0) for Microsoft Windows (x64)". At the time of this writing, the software could be downloaded from the following link:

   http://www.oracle.com/technetwork/database/enterprise-edition/downloads/database12c-win64-download-2297732.html

2. Extract the installation file and run the setup.exe file to install the software.

   In the practice examples, the client software is installed in `D:\oracle\product\12.1.0\client_1`

3. Configure the `tnsnames.ora` file in the client home to connect to the `rac` database, `rac1` instance, and `rac2` instance.

   Note: do not copy the code from the PDF file. Copy it from the downloadable `tnsnames.ora` file.

   When you configure the `rac` database in the client side, use the SCAN IP address. You cannot use the SCAN hostname because it is not configured in the hosts file of your hosting machine.

   When you configure the connections to the instances `rac1` and `rac2`, you use the public addresses of `srv1` and `srv2`, as shown in the code example below.

   Note: In a production system, you never configure connections to the RAC instances in the client side. An application should always use the SCAN hostname and a service name to connect to the RAC database.

```
notepad D:\oracle\product\12.1.0\client_1\network\admin\tnsnames.ora
```

```
RAC =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.56.91)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SERVICE_NAME = rac.localdomain)
    )
  )

RAC1 =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.56.71)(PORT = 1521))
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SID = rac1)
    )
  )

RAC2 =
  (DESCRIPTION =
    (ADDRESS = (PROTOCOL = TCP)(HOST = 192.168.56.72)(PORT = 1521))
```

```
    (CONNECT_DATA =
      (SERVER = DEDICATED)
      (SID = rac2)
    )
  )
```

4. In the hosting machine, test the connection to `rac`, `rac1`, and `rac2`.

```
sqlplus system/oracle@rac
conn system/oracle@rac1
conn system/oracle@rac2
```

B. Install Swingbench 2.5 and set up Order Entry schema

In this section of the practice, you will download and install Swingbench 2.5.

Note: The latest version of Swingbench is 2.6, but it is still a beta version. Personally, I faced issues with it and therefore prefer to use the stable version 2.5 in the course practices.

5. Download Swingbench 2.5 zip file from one of the following sources:

- Practice lecture downloadable resources, download the file **swingbench25971.zip**
- From the following link: http://www.dominicgiles.com/swingbench/swingbench25971.zip

6. Copy the software zip file to the disk drive where you want to install the software. In my case, I copied it to the `D:` drive.

7. Extract the zip file. The files will be automatically extracted to the following path. This folder will be referred to as `$SWINGHOME` folder.

```
<disk drive letter>:\swingbench
```

8. In the hosting PC, open a command prompt window and change the directory to `$SWINGHOME\winbin`

```
cd D:\swingbench\winbin
```

9. Set the `ORACLE_HOME` and `TNS_ADMIN` variables.

```
set ORACLE_HOME=D:\oracle\product\12.1.0\client_1
set TNS_ADMIN=D:\oracle\product\12.1.0\client_1\network\admin
```

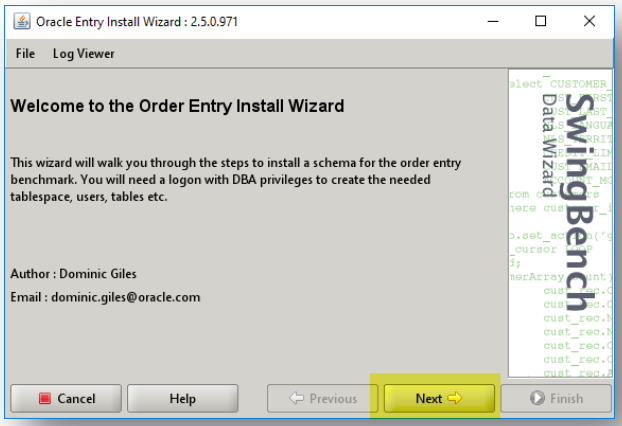
10. Start the Order Entry Wizard by issuing the command `oewizard`.

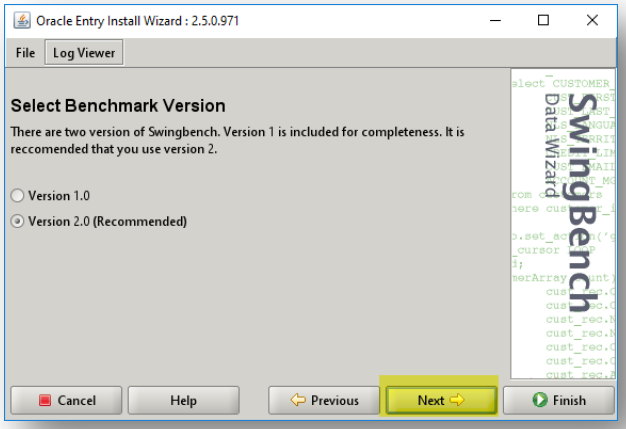
This Wizard creates a simple Order Entry schema. It is similar to the `OE` schema installed by Oracle Examples schemas. The Wizard creates a tablespace for the new schema, grants the required privileges to it, and creates the schema objects.

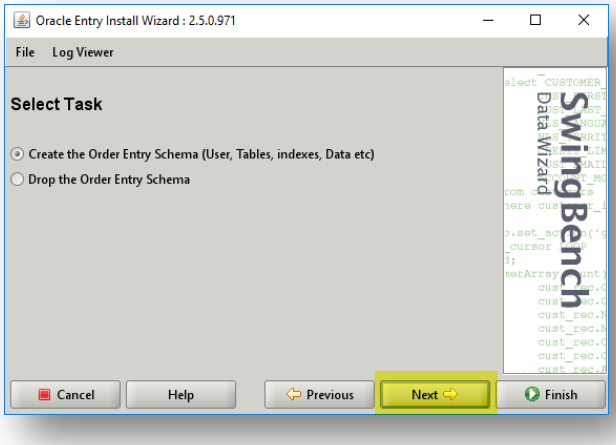
You will use the wizard to create a schema named as `soe`, a tablespace for the schema with the same name, and fill its tables with data. Just go to the next step and follow the instructional screenshots.

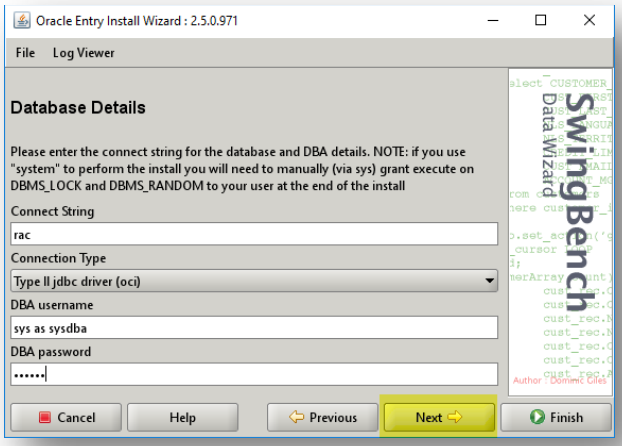
```
oewizard
```

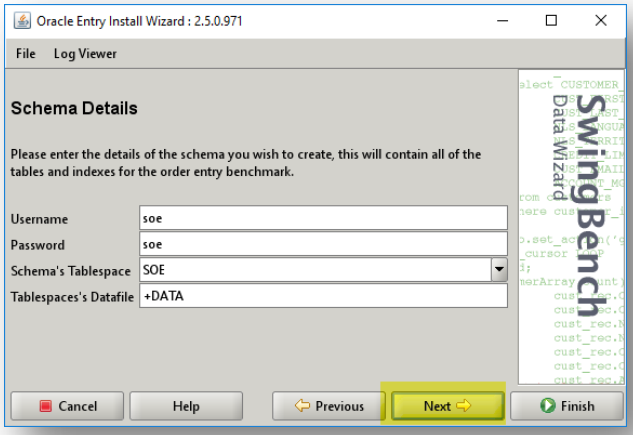
11. Respond to the wizard windows as shown in the following screenshots:

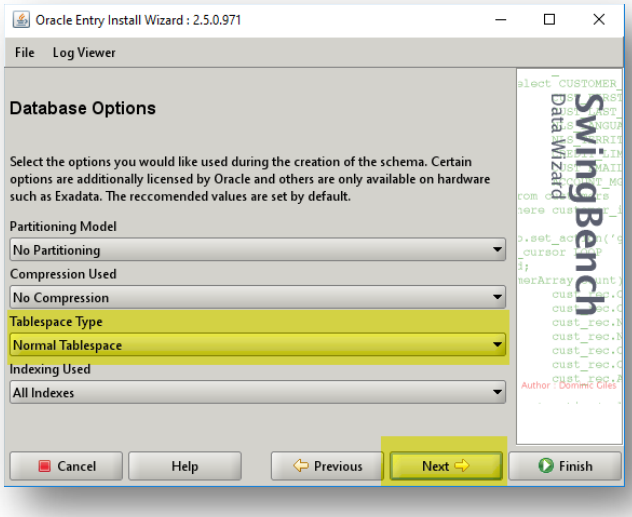


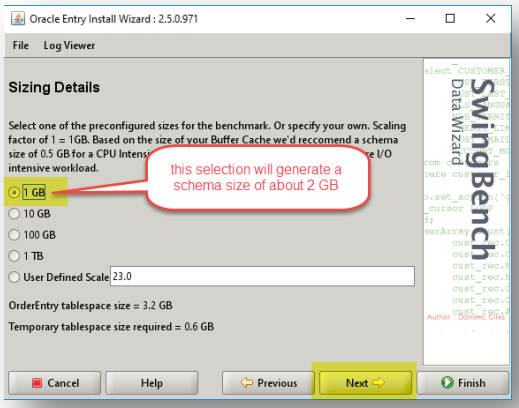


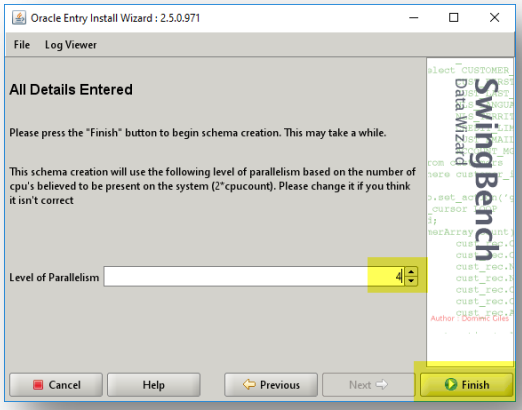


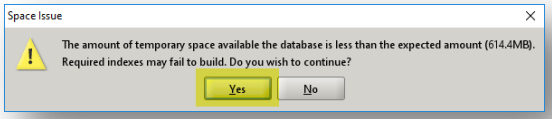

Oracle Entry Install Wizard : 2.5.0.971
File
Log Viewer
Database Details
Please enter the connect string for the database and DBA details. NOTE: if you use "system" to perform the install you will need to manually (via sys) grant execute on DBMS_LOCK and DBMS_RANDOM to your user at the end of the install
Connect String
rac
Connection Type
Type II jdbc driver (oci)
DBA username
sys as sysdba
DBA password
Cancel
Help
Previous
Next
Finish
SwingBench
Data Wizard

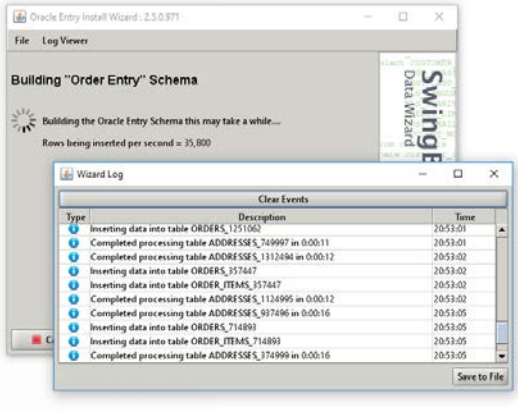

Oracle Entry Install Wizard : 2.5.0.971
File
Log Viewer
Schema Details
Please enter the details of the schema you wish to create, this will contain all of the tables and indexes for the order entry benchmark.
Username
soe
Password
soe
Schema's Tablespace
SOE
Tablespaces's Datafile
+DATA
Cancel
Help
Previous
Next
Finish
SwingBench
Data Wizard

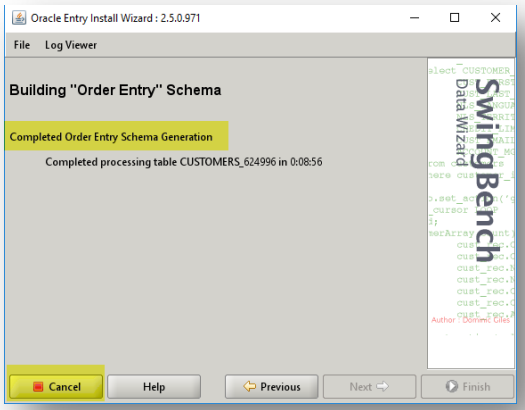

Oracle Entry Install Wizard : 2.5.0.971
File
Log Viewer
Database Options
Select the options you would like used during the creation of the schema. Certain options are additionally licensed by Oracle and others are only available on hardware such as Exadata. The reccomended values are set by default.
Partitioning Model
No Partitioning
Compression Used
No Compression
Tablespace Type
Normal Tablespace
Indexing Used
All Indexes
Cancel
Help
Previous
Next
Finish
SwingBench
Data Wizard


Oracle Entry Install Wizard : 2.5.0.971
File Log Viewer
Sizing Details
Select one of the preconfigured sizes for the benchmark. Or specify your own. Scaling factor of 1 = 1GB. Based on the size of your Buffer Cache we'd reccomend a schema size of 0.5 GB for a CPU Intensive I/O intensive workload.
this selection will generate a schema size of about 2 GB
1 GB
10 GB
100 GB
1 TB
User Defined Scale 23.0
OrderEntry tablespace size = 3.2 GB
Temporary tablespace size required = 0.6 GB
Cancel Help Previous Next Finish
SwingBench Data Wizard


Oracle Entry Install Wizard : 2.5.0.971
File Log Viewer
All Details Entered
Please press the "Finish" button to begin schema creation. This may take a while.
This schema creation will use the following level of parallelism based on the number of cpu's believed to be present on the system (2*cpucount). Please change it if you think it isn't correct
Level of Parallelism 4
Cancel Help Previous Next Finish
SwingBench Data Wizard


Space Issue
The amount of temporary space available the database is less than the expected amount (614.4MB).
Required indexes may fail to build. Do you wish to continue?
Yes No


Oracle Entry Install Wizard : 2.5.0.971
File Log Viewer
Building "Order Entry" Schema
Building the Oracle Entry Schema this may take a while....
Rows being inserted per second = 35,800
Wizard Log
Clear Events
Type Description Time
Inserting data into table ORDERS_1251062 20:53:01
Completed processing table ADDRESSES_749997 in 0:00:11 20:53:01
Completed processing table ADDRESSES_1312494 in 0:00:12 20:53:02
Inserting data into table ORDERS_357447 20:53:02
Inserting data into table ORDER_ITEMS_357447 20:53:02
Completed processing table ADDRESSES_1124995 in 0:00:12 20:53:02
Completed processing table ADDRESSES_937496 in 0:00:16 20:53:05
Inserting data into table ORDERS_714893 20:53:05
Inserting data into table ORDER_ITEMS_714893 20:53:05
Completed processing table ADDRESSES_374999 in 0:00:16 20:53:05
Save to File
SwingBench Data Wizard



12. Verify the soe schema creation. In the command prompt in the hosting machine, issue the following commands.

```
sqlplus soe/soe@rac

-- 13 tables should be returned
SELECT TNAME FROM TAB;

-- gather schema statistics of soe
EXECUTE DBMS_STATS.GATHER_SCHEMA_STATS(ownname => 'SOE');

-- get the total size of schema objects:
SELECT ROUND(SUM(BYTES)/1024/1024/1024,3) GB FROM USER_SEGMENTS;
```

C. Get Started with Swingbench

In this section of the practice, you will start using Swingbench to apply load on the rac database.

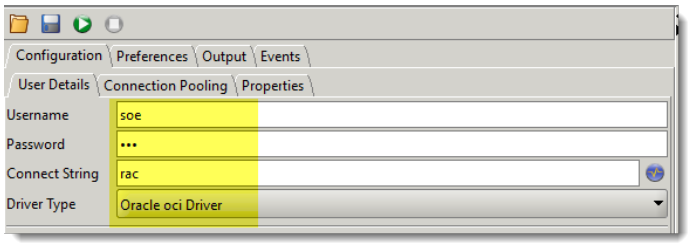
Note: Swingbench has a configuration specific to test a RAC database but the demonstrated procedure below is fair enough for our purposes.

13. In your hosting machine, in the command prompt window, make sure that the current folder is `$SWINGHOME\winbin`

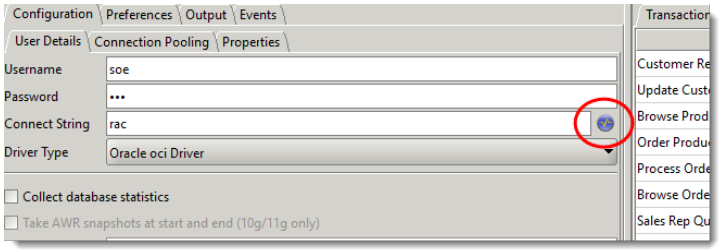
14. Start Swingbench by issuing the following command:

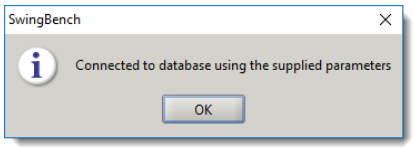
```
swingbench.bat
```

15. Under the **User Details** tab, you define the connection details to the database. Set its fields to the values as in the following screenshot:

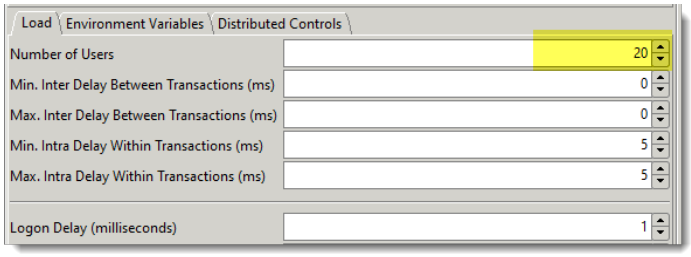


16. Click on "**Test Connection**" button to test the database connection settings. You should see a message indicating that the connection is successful.





17. Under the **Load** tab, change the **Number of Users** to 20. This value sets the number of sessions that the utility will create when you start the benchmark run.



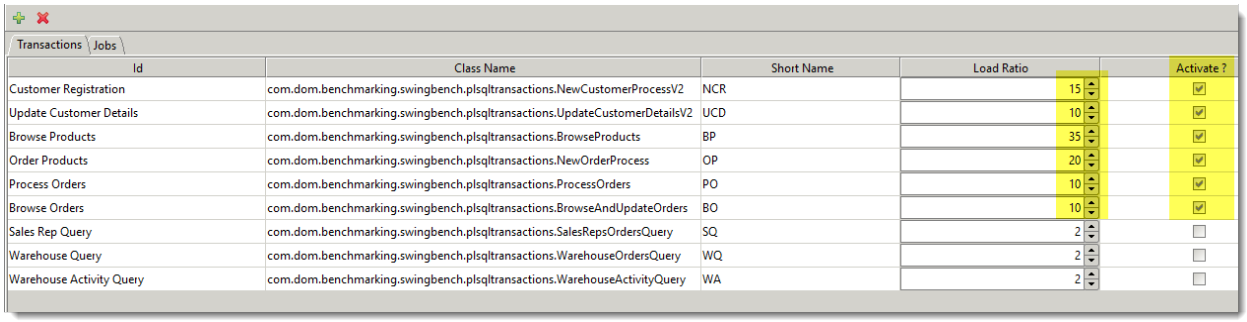
18. Under the **Transactions** tab, define the **Load Ratio** and mark the **Activate check boxes** as shown in the following screenshot.

The checkboxes define the operations that you want to activate during the run. In this practice testing, we are activating the first six operations.

The Load Ratio sets the priority level to each operation. The higher the value, the more often the operation will be executed. It is recommended to make the total load ratio values equal to 100.

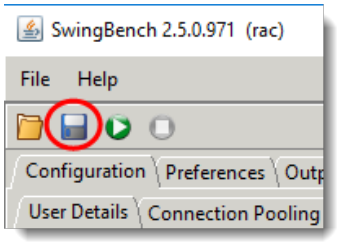
The Load Ratio values shown in the screenshot are proposed values. You can modify them as you wish to accommodate your target. Just remember, insert operations (represented by operations like "**Order Products**") increase the table size and update operations (represented by operations like "**Update Customer Details** ") generate archive logs. If you let the utility operates for long time, you may run out of disk space.

If entering the number in the field does not work in your case (it was not always working in my case), use the small up and down arrows to set the field values.



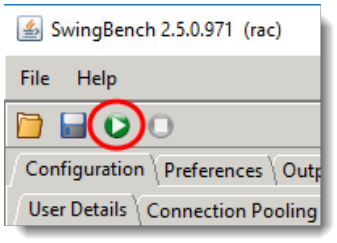
19. Click on **Save** button

When you click on Save button, the settings that you have set in Swingbench interface will be saved in `swingconfig.xml`. The next time you start Swingbench, it reads its settings from the file.

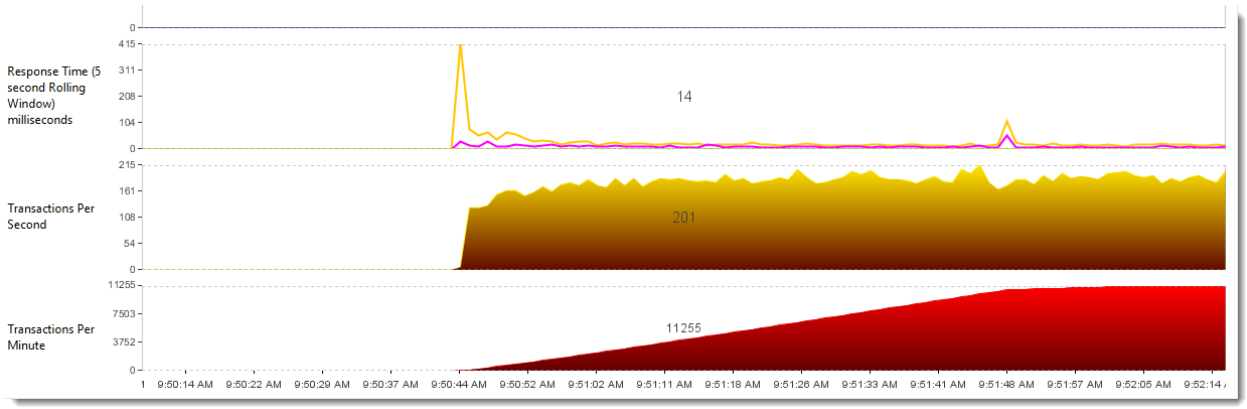


20. Click on the "**Start Benchmark run**" button.

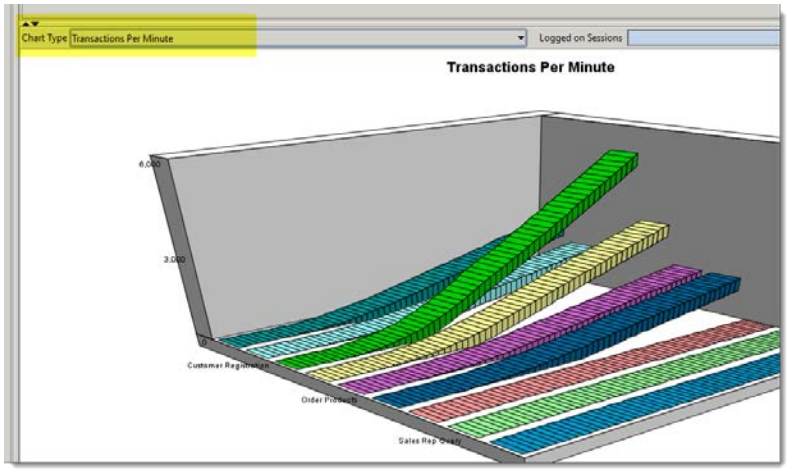
Gradually, Swingbench kicks off connection sessions to the database and executes the selected operations.



21. Observe that the "**Transactions Per Minute**" chart is increasing by time and it eventually gets saturated.



22. Change the **Chart Type** to Transactions Per Minute. Observe how the chart type gets changed. Observe that the operation type that has high load ratio is higher than the operations with lower load ration.



23. Connect in a SQL*Plus session as `system` to `rac` database and check out how many sessions are there from `soe` user.

The query below could return 21 (not 20, as set in Swingbench). The additional connection is the one created by Swingbench when you tested the connection in it. Unfortunately, the utility does not close it.

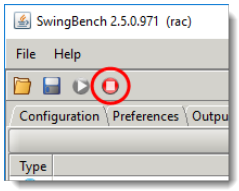
```
sqlplus system/oracle@rac

SELECT COUNT(distinct SID) FROM GV$SESSION WHERE USERNAME='SOE';
```

24. Retrieve the Global Coherency (gc) and Global Enqueue statistics for all SOE sessions. Those statistics are cluster related statistics.

```
col name format a30
SELECT SN.NAME, TO_CHAR(SUM(SS.VALUE),'999,999,999') SUM_VALUE,
TO_CHAR(AVG(SS.VALUE),'999,999,999') AVG_VALUE
FROM   GV$SESSTAT SS,
       GV$STATNAME SN,
       GV$SESSION S
WHERE  SS.STATISTIC# = SN.STATISTIC#
  AND  S.SID = SS.SID
  AND  SS.VALUE <> 0
  AND  S.USERNAME='SOE'
  AND (SN.NAME LIKE 'gc %' OR SN.NAME LIKE 'global %')
GROUP BY SN.NAME
ORDER BY NAME;
```

25. Stop the Benchmark Run by clicking on its button.



26. Exit Swingbench: **File** menu | **Exit**

Summary

Swingbench is a free easy-to-use stress testing utility on Oracle databases. You learnt in this practice how to install it and use its basic functionality.