

The First Example of TimesTen with Oracle on Windows

Introduction

Oracle TimesTen In-Memory Database is a memory-optimized relational database that empowers applications with the instant responsiveness and very high throughput required by today's real-time enterprises and industries such as telecom, capital markets, and defense. Deployed in the application tier as a cache or embedded database, Oracle TimesTen In-Memory Database operates on databases that fit entirely in physical memory using standard SQL interfaces.

TimesTen offers capabilities that extend Oracle's capabilities in a way that the company sees as a critical. TimesTen is able to do this in two ways: it can be used on an Application Server to improve performance; and its in-memory capabilities enable such things as real-time trading and so on.

This article is dedicated to set first application example with TimesTen and Oracle. It covers:

- Installation of TimesTen
- Create ODBC DSN for TimesTen with Oracle
- Create required oracle account
- Create an account on TimesTen
- Update TimesTen ODBC DSN
- Create a connection to TimesTen database (with SQL Developer)
- Create cache group with "Cache Connect to Oracle Cache Administrator"
- Demonstrate autorefresh between Oracle and TimesTen

Installation of TimesTen

The installation of TimesTen on windows is quite easy. Oracle offers a good installation tutorial at

http://www.oracle.com/technology/products/timesten/viewlets/tt70_install_win_viewlet.swf.html .

The only two things need to be mentioned here are "Cache Connect to Oracle" and "Enable Datastore Access Control", which are optional during the process of installation. "Cache Connect to Oracle" is required to install if you want to cache oracle tables in TimesTen as shown in Figure 1. As for "Enable Datastore Access Control", checking it provides an environment of basic control for applications that use the internally defined privileges. In this case, it's checked because I want to investigate more on TimesTen (as shown in Figure 2).

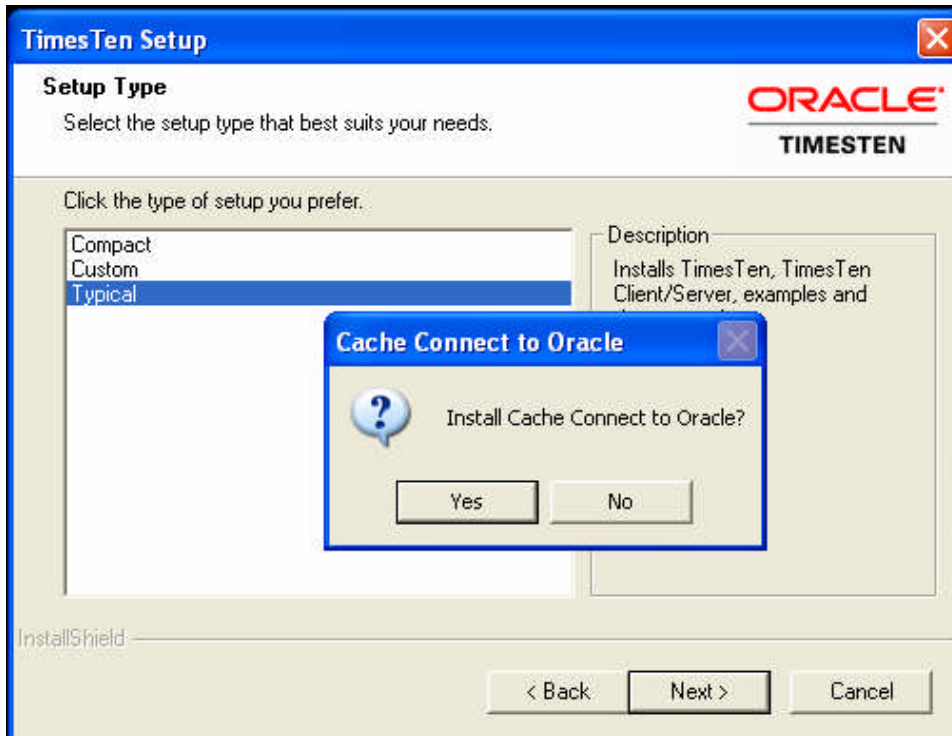


Figure 1: Option to Install Cache Connect to Oracle

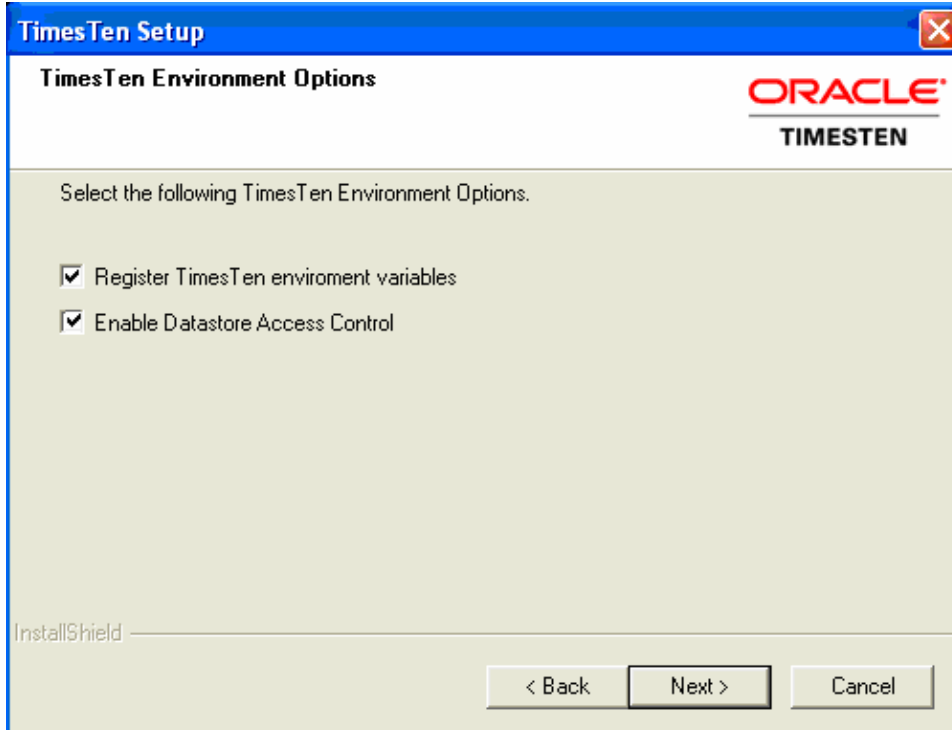


Figure 2: Option to Enable Database Access Control

Create ODBC data source for TimesTen with Oracle

There is an illustrated tutorial about how to create data source name (DSN) for TimesTen on Windows. It's available at

http://www.oracle.com/technology/products/timesten/viewlets/tt70_create_db_win_cc_viewlet_swf.html.

What I was doing is light different to this oracle demo. I created a DSN, called j_timesten, without defining "User ID" as shown in Figure 3.

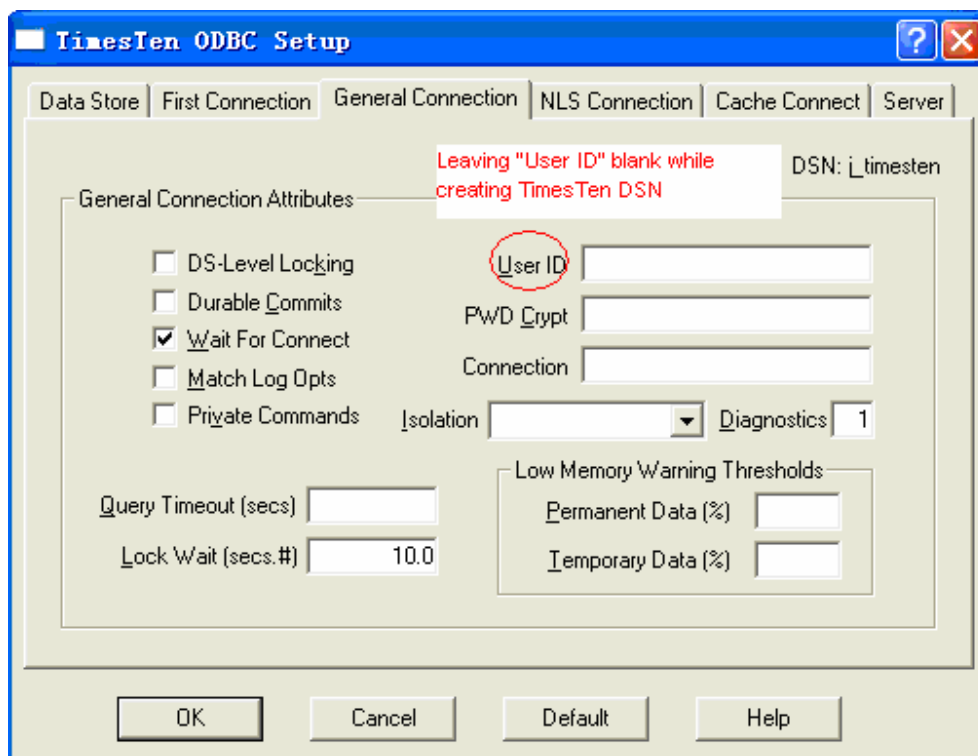


Figure 3: TimesTen ODBC Setup

There are two reasons why I didn't define "User ID" while I created ODBC DSN. First, an oracle account, which is appropriate for using cache connect to oracle, need to be created with sufficient privileges. Second, leaving "User ID" blank makes it possible to create an account on TimesTen.

The oracle account is usually the owner of bunch of tables that TimesTen instance would like to cache in physical memory. And, without defining "User ID" in Figure 3, we can connect created TimesTen DSN (j_timesten in this case) as default to create TimesTen users. That's because the instance data store is defined by TimesTen at installation time can give the instance administrator a data store connection on which administrative tasks can be performed. Both of above discussion will be discussed in later two steps.

Create required oracle account

To simplify this demo, I easily use the default oracle user SCOTT and also grant necessary privileges to it. Among the privileges, “Create Any Trigger” is important to this oracle account to create internal trigger to do autorefresh between TimesTen and Oracle.

```
C:\>sqlplus system@orcl

SQL*Plus: Release 10.1.0.2.0 - Production on Friday Nov 16 21:54:00 2007

Copyright (c) 1982, 2004, Oracle. All rights reserved.

Enter password:

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

SQL> alter user scott account unlock;

User altered.

SQL> alter user scott identified by xxxxxxxx;

User altered.

SQL> grant connect, resource, create any trigger to scott;

Grant succeeded.

SQL> commit;

Commit complete.
```

List 1: Oracle account

Create an account on TimesTen

In DOS prompt, typing “ttisql j_timesten” will lead you to connect the TimesTen DSN created previously. Note that the UID which is used to log on TimesTen DSN is wangr, which is my network logon account with workstation administration privileges. Without defining “User ID” while creating TimesTen DSN j_timesten will make default

connection to DSN with OS/Network account. Once logged on, create a TimesTen user with sufficient privileges.

```
C:\>ttisql j_timesten

Copyright (c) 1996-2007, Oracle. All rights reserved.
Type ? or "help" for help, type "exit" to quit ttIsql.
All commands must end with a semicolon character.

connect "DSN=j_timesten";
Connection successful: DSN=j_timesten;UID=wangr;DataStore=C:\Program Files\
mesTen\tt70_32\j_timesten;DatabaseCharacterSet=US7ASCII;ConnectionCharacterSet
S7ASCII;DRIVER=C:\Program Files\TimesTen\tt70_32\bin\ttdv70.dll;OracleId=orcl;
gDir=C:\Program Files\TimesTen\tt70_32\j_timesten;PermSize=20;TempSize=20;Type
de=0;
(Default setting AutoCommit=1)
Command> create user scott identified by 'xxxxxxx';
Command> grant ADMIN,DDL to scott;
Command>
```

List 2: create TimesTen account with admin privileges

Update TimesTen ODBC data source (created in step 2)

Once the TimesTen account is created, please go update TimesTen DSN configuration to add "User ID" as scott, in this case.

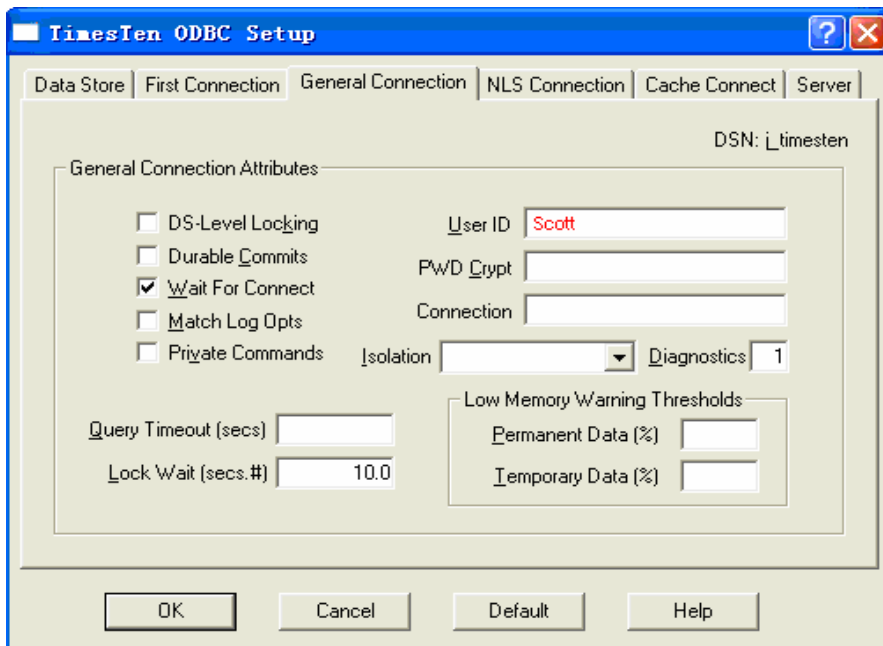


Figure 4: Add User ID once oracle and TimesTen account are created
Create a connection to TimesTen database (with SQL Developer)

In this case, the tool I used to demonstrate the application is Oracle SQL Developer, which is available at <http://www.oracle.com/technology/software/products/sql/index.html> .

Please be noted that it's required to have Oracle SQL Developer updated with extension for Oracle TimesTen. The demo is available at http://www.oracle.com/technology/products/timesten/viewlets/tt703_sqldev_install_ext_viewlet_swf.html .

And then, creating a new connection to TimesTen database in Oracle SQL Developer is a truly simple thing as shown in Figure 5.

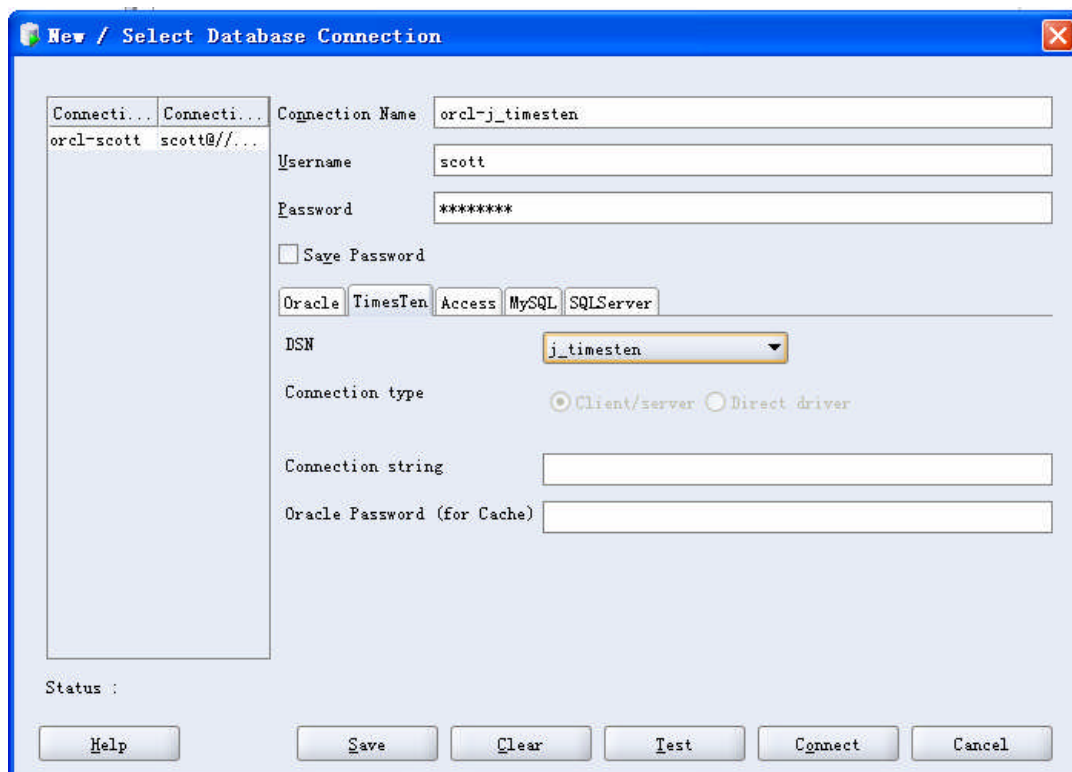


Figure 5: create new connect o TimesTen database

For this, oracle also offers illustrated demon at http://www.oracle.com/technology/products/timesten/viewlets/tt703_sqldev_imdb_viewlet_swf.html .

Upon establishing connect to TimesTen database, you'll find that no Cache Group has been created yet. Next, we're going to create a cache group.

Create cache group with “Cache Connect to Oracle Cache Administrator”

The first step we need to do to create READONLY cache group is to start cache agent for the data store.

```
C:\>ttisql j_timesten

Copyright (c) 1996-2007, Oracle. All rights reserved.

Type ? or "help" for help, type "exit" to quit ttIsql.

All commands must end with a semicolon character.

connect "DSN=j_timesten";

Enter password for 'scott':

Connection successful: DSN=j_timesten;UID=scott;DataStore=C:\Program
Files\TimesTen\tt70_32\j_timesten;DatabaseCharacterSet=US7ASCII;

ConnectionCharacterSet=US7ASCII;DRIVER=C:\Program
Files\TimesTen\tt70_32\bin\tt70.dll;OracleId=orcl;Perms

ize=40;TempSize=40;TypeMode=0;

(Default setting AutoCommit=1)

Command> call ttCacheUidPwdSet('scott','xxxxxxxx');

Command> call ttCacheStart;

Command>
```

List 3: create cache agent for data store before creating cache group

In List 3, we use the TimesTen account created before. The account, scott in this case, can perform administration jobs on TimesTen because it's granted admin privileges.

Once cache agent is started, please follow Start->Programs->TimesTen 7.0 (32-bit) -> Cache Connect to Oracle Cache Administrator. This is web-based tool to create cache group against the created TimesTen DSN (j_timesten, in this case).

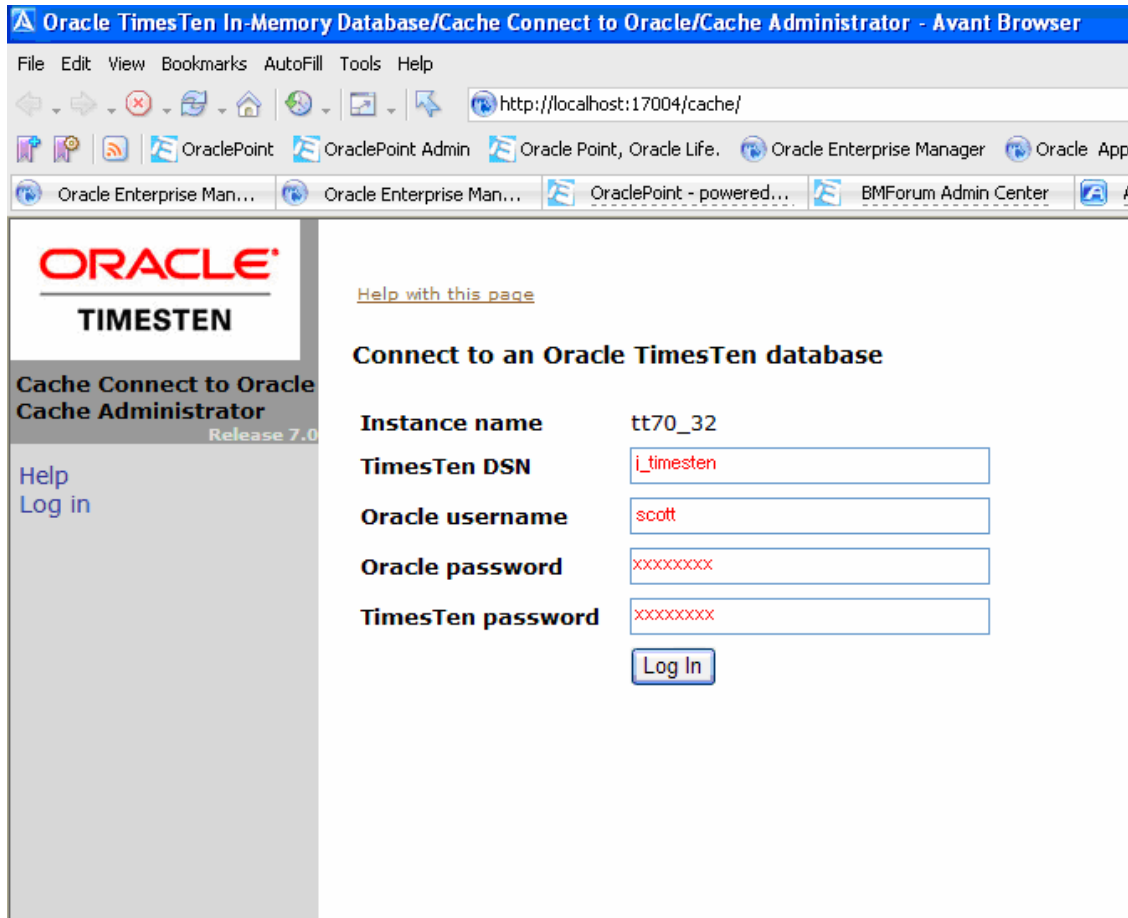


Figure 6: Create Cache Group for TimesTen Database

In input text area “TimesTen password”, please enter the password of TimesTen account created previously. After successful logon, there are two things you need to do.

1. create a cache group definition
2. create a cache group upon the definition.

The process of creating cache group is easily navigated. Here, two things need to be mentioned. First, select the table fields as you want because the system usually only pick up the indexed fields. Second, the table without primary key, foreign key and unique constraint is not allowed to be cached to TimesTen database.

The cache group j_cache_group I created is shown in Figure 7.

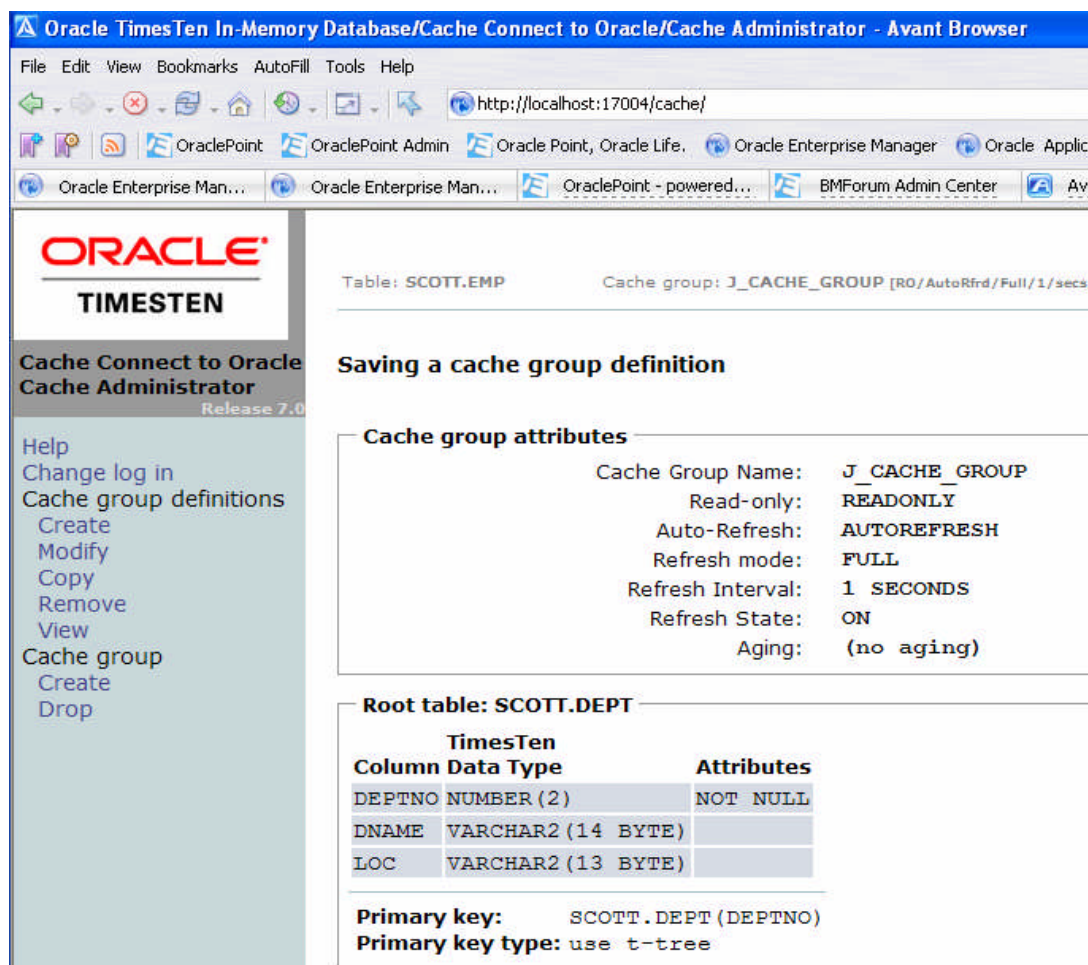


Figure 7: cache group definition

Demonstrate autorefresh between Oracle and TimesTen

Now, all the setting about TimesTen and Oracle is done. And, it's time to check the functionality offered by TimesTen.

In this case, I just created a simple READONLY cache group which is based on two typical scott's tables: DEPT and EMP. For this case, any oracle side changes on scott's tables DEPT and EMP will be automatically applied to TimesTen tables.

You'll find a cache group under TimesTen connection in Oracle SQL Developer if you do a refresh or rebooting. Also, two tables show up in TimesTen connection. I simply add one record to scott's table EMP in oracle side. And, it populates to TimesTen's table EMP in no time as shown in Figure 8.

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
1	7369 SMITH	CLERK	7902	1980-12-17 ...	800	(null)	20
2	7499 ALLEN	SALES...	7698	1981-02-20 ...	1600	300	30
3	7521 WARD	SALES...	7698	1981-02-22 ...	1250	500	30
4	7566 JONES	MANA...	7839	1981-04-02 ...	2975	(null)	20
5	7654 MARTIN	SALES...	7698	1981-09-28 ...	1250	1400	30
6	7698 BLAKE	MANA...	7839	1981-05-01 ...	2850	(null)	30
7	7782 CLARK	MANA...	7839	1981-06-09 ...	2450	(null)	10
8	7788 SCOTT	ANAL...	7566	1987-04-19 ...	3000	(null)	20
9	7839 KING	PRESID...	(null)	1981-11-17 ...	5000	(null)	10
10	7844 TURNER	SALES...	7698	1981-09-08 ...	1500	0	30
11	7876 ADAMS	CLERK	7788	1987-05-23 ...	1100	(null)	20
12	7900 JAMES	CLERK	7698	1981-12-03 ...	950	(null)	30
13	7902 FORD	ANAL...	7566	1981-12-03 ...	3000	(null)	20
14	7934 MILLER	CLERK	7782	1982-01-23 ...	1300	(null)	10
15	8001 james	dba	7902	2007-09-12 ...	1500	(null)	20

Figure 8: Changes made on Oracle side is populated to TimesTen's table.

In Closing

There are totally four types of cache group offered in TimesTen. They are:

- READONLY (implies AUTOREFRESH)
- ASYNCHRONOUS WRITETHROUGH
- SYNCHRONOUS WRITETHROUGH
- USERMANAGED (choose this if you plan to manage the cache group yourself)

This article is only starting of using TimesTen database.

Resources

Oracle TimesTen In-Memory Database

<http://www.oracle.com/technology/products/timesten/index.html>

About Author

R. Wang currently works as Oracle DBA in Canada. He is responsible for database performance tuning and high availability. With over 10 years experience in architecting and building oracle systems, Rui is an evangelist for oracle technology and products. Rui is OCP and received master degree in computer science from Simon Fraser University in Canada.

Visit Rui's blog: www.oraclepoint.com/oralife and be member of www.oraclepoint.com for more resources.