The Second Example of TimesTen with Oracle

In the first article of this series, I illustrated

- how to use “Windows odbs data source administrator” to create data source
- how to set attributes for odbc data source (database character set, permanent/tempory data size, user id with password, and oracle id)
- how to use “cache connect to oracle cache administrator” to create cache group
- how to use oracle sql developer to view visual data cache with oracle

As the second article of series for Oracle TimesTen, this article describes the implementation of TimesTen application under Unix. It shows how to use TimesTen utilities to do operation, such as connecting data source, querying, loading, inserting, database backing up and database recovery.

Creating ODBC Data Source

To create ODBC data source, it’s easy as creating a file named odbc.ini under unix logon folder with the following attributes.

```
[ODBC Data Sources]
mytimesten=TimesTen 6.0 Driver

[DemoDataStore]
DataStore=/home/fee/TimesTen6/DemoDataStore
DurableCommits=0
PermSize=16
```

Connecting Data Source and Creating Tables

Now, connect odbc data source and create several tables in TimesTen.

We’ll:

- Use **ttIsql** to connect odbc data source
- Create tables customer, ref_products, and orders
- Use command **describe** to show the tables
• Show all tables under data source with command **host ttSchema**

```sql
[TEST]/home/fee>ttIsq1
Copyright (c) 1996-2006, Oracle. All rights reserved.
Type ? or "help" for help, type "exit" to quit ttIsq1.
All commands must end with a semicolon character.

Command> connect "DSN=DemoDataStore";
IM002: Data source name not found and no default driver specified
The command failed.
Command> connect "DSN=DemoDataStore";
Connection successful: DSN=DemoDataStore;UID=fee;DataStore=/home/fee/TimesTen6/DemoDataStore;PermSize=16;
(Default setting AutoCommit=1)

Command> create table customer
  > (cust_number integer not null primary key,
  >  first_name char(12) not null,
  >  last_name char(12) not null,
  >  address varchar (100) not null);

Command> describe customer;
Table FEE.CUSTOMER:
Columns:
  *CUST_NUMBER INTEGER NOT NULL
  FIRST_NAME CHAR (12) NOT NULL
  LAST_NAME CHAR (12) NOT NULL
  ADDRESS VARCHAR (100) INLINE NOT NULL

1 table found.
(primary key columns are indicated with *)

Command> create table ref_products
  > (prod_number char(10) not null primary key,
  >  prod_name varchar(100) not null,
  >  price decimal(6,2) not null);

Command> create table orders
  > (order_number integer not null,
  >  cust_number integer not null,
  >  prod_name char(10) not null,
  >  order_date date not null);

Command> host ttSchema DemoDataStore;
```

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create table FEE.CUSTOMER (  
    CUST_NUMBER INTEGER not null,  
    FIRST_NAME CHAR(12) not null,  
    LAST_NAME CHAR(12) not null,  
    ADDRESS VARCHAR(100) inline not null,  
    primary key (CUST_NUMBER));

create table FEE.ORDERS (  
    ORDER_NUMBER INTEGER not null,  
    CUST_NUMBER INTEGER not null,  
    PROD_NAME CHAR(10) not null,  
    ORDER_DATE DATE not null);

create table FEE.REF_PRODUCTS (  
    PROD_NUMBER CHAR(10) not null,  
    PROD_NAME VARCHAR(100) inline not null,  
    PRICE DECIMAL(6,2) not null,  
    primary key (PROD_NUMBER));

Command> exit
Disconnecting...
Done.

Loading Data through Flat File

What we do in this step is to load bulk data from flat file “customer.dat”, “orders.dat”, “ref_products.dat” to TimesTen table “customer”, “orders”, “ref_products”, respectively, which belong to the schema “fee”.

[TEST]/home/fee/TimesTen6/DemoDataStore> ls -al
total 32
drwxrwxrwx 2 fee dba 256 Oct 24 17:25 ./
drwxr-xr-x 3 fee dba 4096 Oct 24 17:25 ../
-r--r--r-- 1 fee dba 1565 Oct 24 17:24 customer.dat
-r--r--r-- 1 fee dba 1591 Oct 24 17:24 orders.dat
-r--r--r-- 1 fee dba 967 Oct 24 17:24 ref_products.dat

[TEST]/home/fee/TimesTen6/DemoDataStore> pwd
/home/fee/TimesTen6/DemoDataStore

[TEST]/home/fee/TimesTen6/DemoDataStore> cat customer.dat
3700,"Peter","Burchard","882 Osborne Avenue, Boston, MA 02122"
1121,"Saul","Mendoza","721 Stardust Street, Mountain View, CA 94043"
1278,"Mary","Behr","2233 Emerson Road, Vancouver, WA 98663"
1868,"Paul","Tu","308 Bowman Court, Palo Alto, CA 94309"
3645,"John","Silva","3329 Taffy Lane, Atlanta, GA 30314"
1935,"Sandra","Lao","115 Spangler Avenue, San Jose, CA 95112"
1002,"Marco","Mueller","40 East 5th Avenue, New York, NY 10009"
2364,"Karen","Johnson","3971 Hill Road, Chicago, IL 60608"
2655,"Linda","Garcia","7599 Clark Road, Denver, CO 80210"
1077,"Gautam","Mudunuri","16 Welsley Avenue, Fremont, CA 94555"
3864,"Ruth","Silver","88 West 65th Street, New York, NY 10009"
1010,"Fatima","Borba","6868 Bascom Avenue, San Jose, CA 95128"
2300,"Pavel","Popov","233 Loredo Street, Dallas, TX 75210"
1001,"Steven","McPhee","72 Vine Street, San Jose, CA 95125"
3525,"Anthony","Bianchi","122 Fuller Avenue, Patchogue, NY 11772"
2826,"Mary","Anderson","6363 Bjorn Road, Minneapolis, MN 55417"
2435,"Juanita","Dawes","733 Valdosta Avenue, Baton Rouge, LA 70816"
1224,"Abdul","Aziz","6793 Bird Avenue, San Jose, CA 95126"
3611,"Katherine","McKenzie","54 East 21st Avenue, New York, NY 10009"
1900,"Patricia","Levesque","658 Aristotle Road, Palo Alto, CA 94305"
3290,"Paula","Rossi","21 West 54th Street, New York, NY 10009"
1665,"David","Singh","4001 West Hedding, San Jose, CA 95216"
3098,"Cynthia","Stewart","333 East Palm Street, Miami, FL 33150"
1133,"Kerri","Haas","68 East San Fernando, San Jose, CA 95113"
2555,"Bo","Smith","124 North 1st Street, Dallas, TX 75210"

[TEST]/home/fee/TimesTen6/DemoDataStore> ttBulkCp -i -d warn DSN=DemoDataStore fee.customer customer.dat

customer.dat:
   25 rows inserted
   25 rows total

[TEST]/home/fee/TimesTen6/DemoDataStore> ttBulkCp -i -d warn DSN=DemoDataStore fee.orders orders.dat

orders.dat:
   43 rows inserted
   43 rows total

[TEST]/home/fee/TimesTen6/DemoDataStore> ttBulkCp -i -d warn DSN=DemoDataStore fee.ref_products ref_products.dat

ref_products.dat:
   15 rows inserted
   15 rows total

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**Querying Table Data upon Bulk Loading**

To make sure the bulk loading was successful, we do re-logon and query the data against table “customer”.

```
[TEST]/home/fee/TimesTen6/DemoDataStore>ttIsql

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Type ? or "help" for help, type "exit" to quit ttIsql.
All commands must end with a semicolon character.

Command> connect "DSN=DemoDataStore";
Connection successful: DSN=DemoDataStore;UID=fee;DataStore=/home/fee/TimesTen6/DemoDataStore;PermSize=16;
( Default setting AutoCommit=1)

Command> select * from customer;
< 3700, Peter , Burchard , 882 Osborne Avenue, Boston, MA 02122 >
< 1121, Saul , Mendoza , 721 Stardust Street, Mountain View, CA 94043 >
< 1278, Mary , Behr , 2233 Emerson Road, Vancouver, WA 98663 >
< 1868, Paul , Tu , 308 Bowman Court, Palo Alto, CA 94309 >
< 3645, John , Silva , 3329 Taffy Lane, Atlanta, GA 30314 >
< 1935, Sandra , Lao , 115 Spangler Avenue, San Jose, CA 95112 >
< 1002, Marco , Mueller , 40 East 5th Avenue, New York, NY 10009 >
< 2364, Karen , Johnson , 3971 Hill Road, Chicago, IL 60608 >
< 2655, Linda , Garcia , 7599 Clark Road, Denver, CO 80210 >
< 1077, Gautam , Mudunuri , 16 Welsley Avenue, Fremont, CA 94555 >
< 3864, Ruth , Silver , 88 West 65th Street, New York, NY 10009 >
< 1010, Fatima , Borba , 6868 Bascom Avenue, San Jose, CA 95128 >
< 2300, Pavel , Popov , 233 Loredo Street, Dallas, TX 75210 >
< 1001, Steven , McPhee , 72 Vine Street, San Jose, CA 95125 >
< 3525, Anthony , Bianchi , 122 Fuller Avenue, Patchogue, NY 11772 >
< 2826, Mary , Anderson , 6363 Bjorn Road, Minneapolis, MN 55417 >
< 2435, Juanita , Dawes , 733 Valdosta Avenue, Baton Rouge, LA 70816 >
< 1224, Abdul , Aziz , 6793 Bird Avenue, San Jose, CA 95126 >
< 3611, Katherine , McKenzie , 54 East 21st Avenue, New York, NY 10009 >
< 1900, Patricia , Levesque , 658 Aristotle Road, Palo Alto, CA 94305 >
< 3290, Paula , Rossi , 21 West 54th Street, New York, NY 10009 >
< 1665, David , Singh , 4001 West Hedding, San Jose, CA 95126 >
< 3098, Cynthia , Stewart , 333 East Palm Street, Miami, FL 33150 >
< 1133, Kerri , Haas , 68 East San Fernando, San Jose, CA 95113 >
< 2555, Bo , Smith , 124 North 1st Street, Dallas, TX 75210 >
25 rows found.
```
SQL Manipulation

The sql manipulation we do below shows that manipulating data under TimesTen is similar with action we usually do in oracle database.

Command> `insert into customer
> values(1365,'Josephine','Rogers','2100 Augustine Drive, Santa Clara, CA 95054');`
1 row inserted.

Command> `select * from customer where cust_number=1365;
< 1365, Josephine , Rogers , 2100 Augustine Drive, Santa Clara, CA 95054 >`
1 row found.

Backing up TimesTen database

The backup of TimesTen database is also easy to implement just with simple command by using utility “ttBackup”.

```
[TEST]/home/fee/TimesTen6>mkdir backup
[TEST]/home/fee/TimesTen6>ls
DemoDataStore/ DemoDataStore.ds1 DemoDataStore.res0 DemoDataStore.res2
DemoDataStore.ds0 DemoDataStore.log0 DemoDataStore.res1 backup/

[TEST]/home/fee/TimesTen6>ttBackup -dir /home/fee/TimesTen6/backup "DSN=DemoDataStore";
Backup started ...
Backup complete

[TEST]/home/fee/TimesTen6>cd backup
[TEST]/home/fee/TimesTen6/backup>ls
DemoDataStore.0.bac DemoDataStore.0.bac0 DemoDataStore.sta

[TEST]/home/fee/TimesTen6/backup>ls -l
total 29592
-rw------- 1 fee dba 14549816 Oct 24 17:44 DemoDataStore.0.bac
-rw------- 1 fee dba 589824 Oct 24 17:44 DemoDataStore.0.bac0
-rw------- 1 fee dba 688 Oct 24 17:44 DemoDataStore.sta
```
Destroying and Recovering TimesTen database

If we destroy the TimesTen database, it’s still possible to recover it as what happens with oracle database.

We do:

- Check status of TimesTen database with “ttstatus”
- Destroy TimesTen database with “ttDestroy”
- Recover TimesTen database with “ttRestore”

```
[TEST]/home/fee/TimesTen6/backup> ttstatus
TimesTen status report as of Tue Oct 24 17:47:25 2006
Daemon pid 782504 port 16001 instance TimesTen6
TimesTen server pid 774300 started on port 16003
No TimesTen webserver running

Data store /home/fee/TimesTen6/DemoDataStore
There are no connections to the data store
Replication policy : Manual
Cache agent policy : Manual

End of report
```

```
[TEST]/home/fee/TimesTen6/backup> ttDestroy /home/fee/TimesTen6/DemoDataStore
```

```
[TEST]/home/fee/TimesTen6/backup> ttstatus
TimesTen status report as of Tue Oct 24 17:51:59 2006
Daemon pid 782504 port 16001 instance TimesTen6
TimesTen server pid 774300 started on port 16003
No TimesTen webserver running

End of report
```

```
[TEST]/home/fee/TimesTen6/DemoDataStore> ttRestore -dir /home/fee/TimesTen6/backup "DSN=DemoDataStore"
Restore started ...
Restore complete
```

```
[TEST]/home/fee/TimesTen6> ttstatus
```
TimesTen status report as of Tue Oct 24 17:53:46 2006

Daemon pid 782504 port 16001 instance TimesTen6
TimesTen server pid 774300 started on port 16003
No TimesTen webserver running

------------------------------------------------------------------------
Data store /home/fee/TimesTen6/DemoDataStore
There are no connections to the data store
Replication policy : Manual
Cache agent policy : Manual
------------------------------------------------------------------------
End of report

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.
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