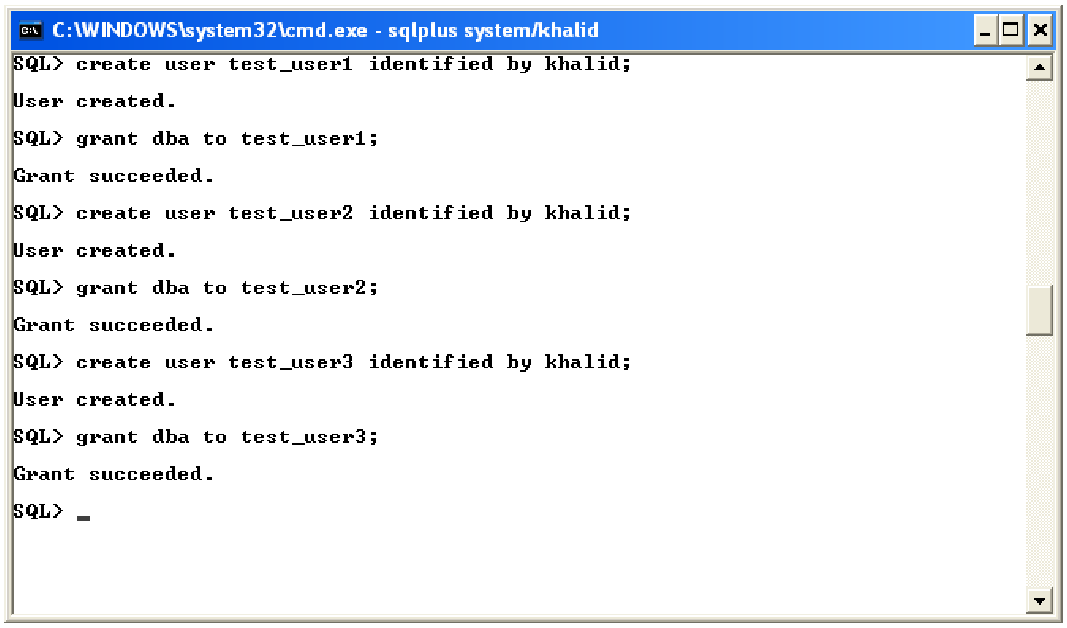
APPENDIX A

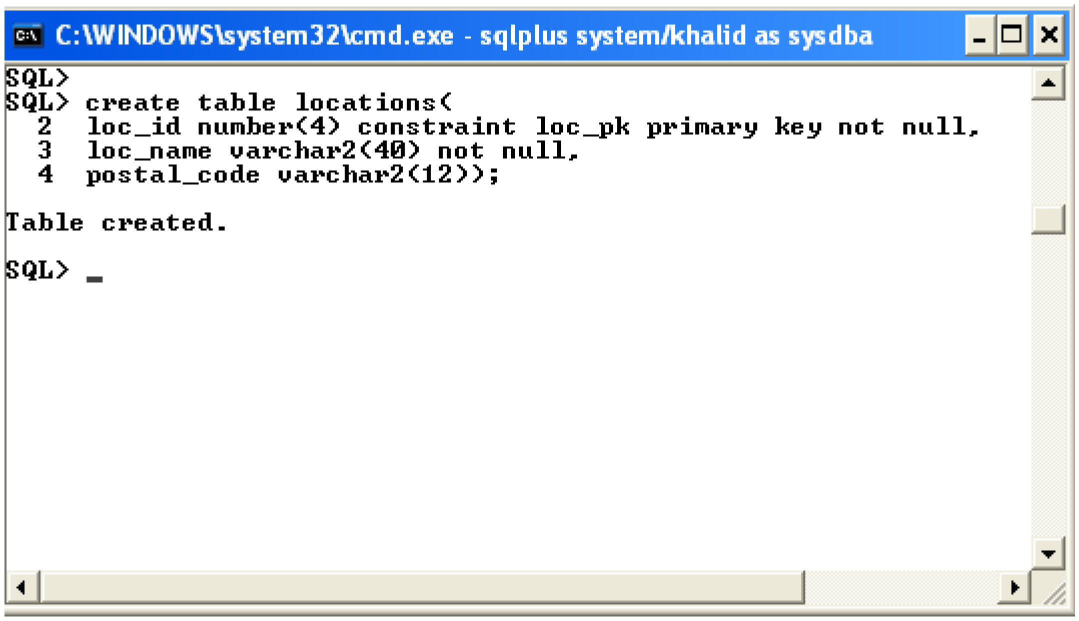
Oracle Database Creation (Oracle 10g)



C:\WINDOWS\system32\cmd.exe - sqlplus system/khalid

```
SQL> create user test_user1 identified by khalid;

User created.

SQL> grant dba to test_user1;

Grant succeeded.

SQL> create user test_user2 identified by khalid;

User created.

SQL> grant dba to test_user2;

Grant succeeded.

SQL> create user test_user3 identified by khalid;

User created.

SQL> grant dba to test_user3;

Grant succeeded.

SQL> _
```

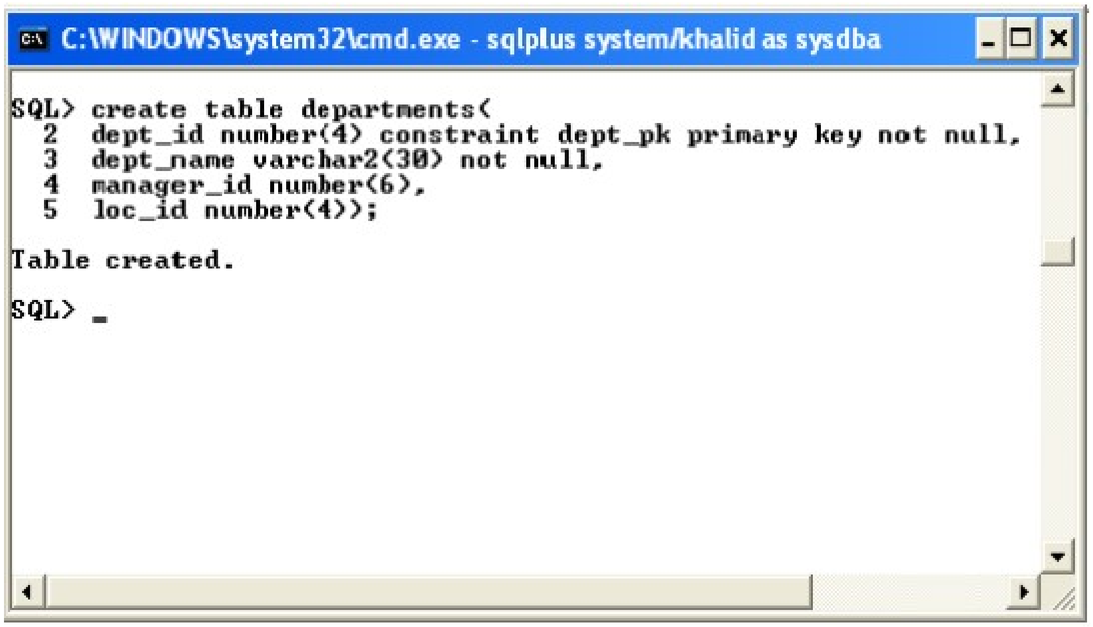
Figure 1 – Creation of the users



C:\WINDOWS\system32\cmd.exe - sqlplus system/khalid as sysdba

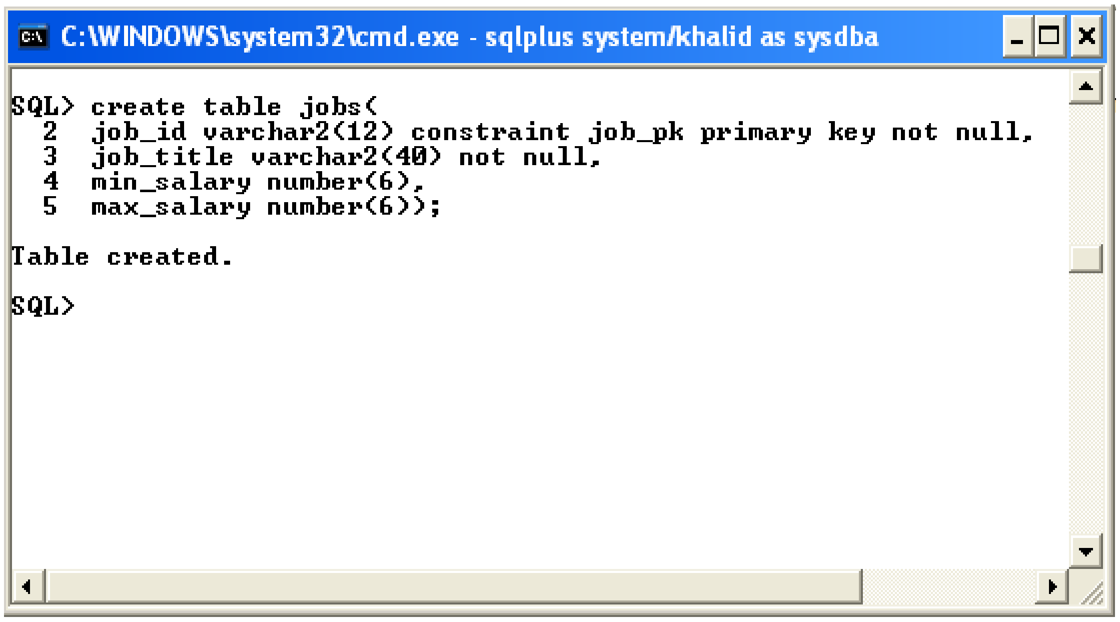
```
SQL>
SQL> create table locations(
  2  loc_id number(4) constraint loc_pk primary key not null,
  3  loc_name varchar2(40) not null,
  4  postal_code varchar2(12));

Table created.

SQL> _
```

Figure 2 – 'Locations' table creation


C:\WINDOWS\system32\cmd.exe - sqlplus system/khalid as sysdba

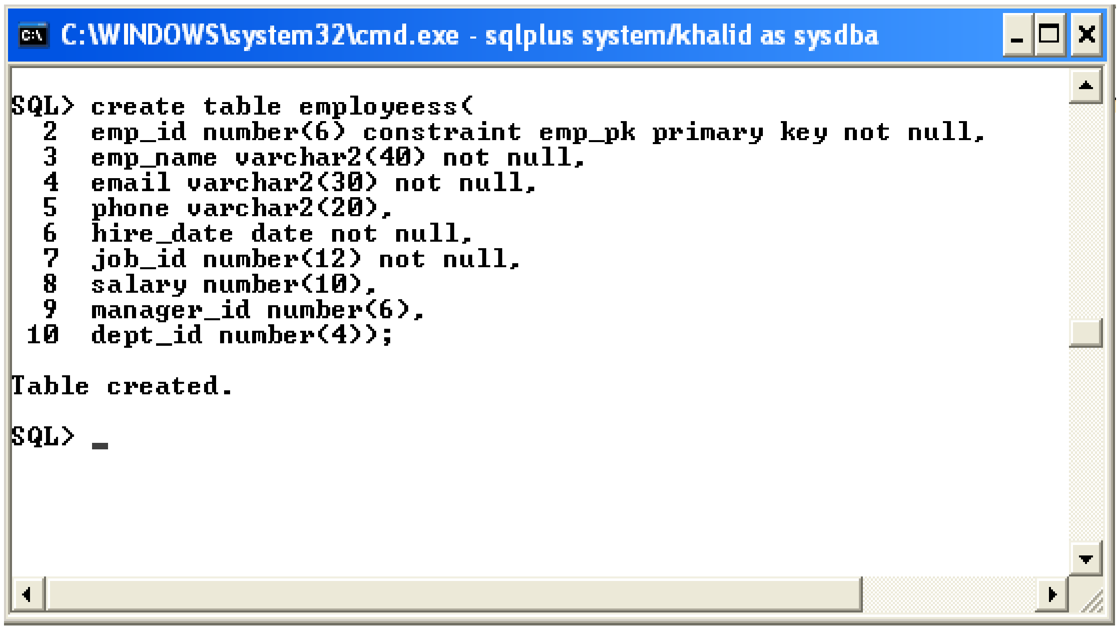
```
SQL> create table departments(
  2  dept_id number(4) constraint dept_pk primary key not null,
  3  dept_name varchar2(30) not null,
  4  manager_id number(6),
  5  loc_id number(4));

Table created.

SQL> _
```

Figure 3 – 'Departments' table creation


C:\WINDOWS\system32\cmd.exe - sqlplus system/khalid as sysdba

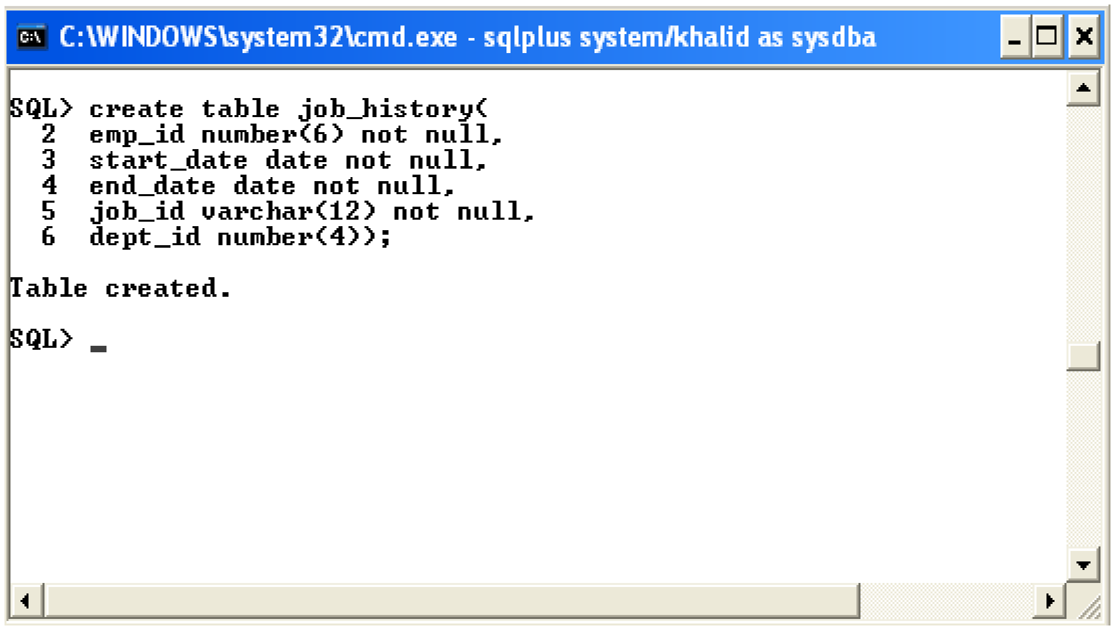
```
SQL> create table jobs(
  2  job_id varchar2(12) constraint job_pk primary key not null,
  3  job_title varchar2(40) not null,
  4  min_salary number(6),
  5  max_salary number(6));

Table created.

SQL>
```

Figure 4 – 'Jobs' table creation


C:\WINDOWS\system32\cmd.exe - sqlplus system/khalid as sysdba

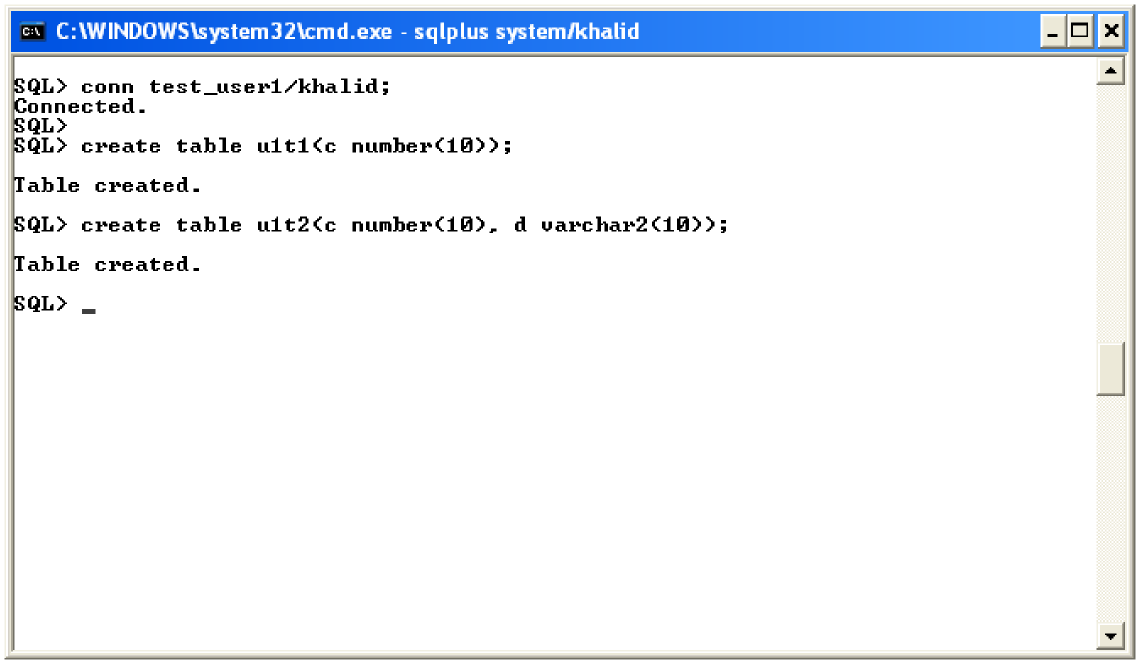
```
SQL> create table employeess(
     emp_id number(6) constraint emp_pk primary key not null,
     emp_name varchar2(40) not null,
     email varchar2(30) not null,
     phone varchar2(20),
     hire_date date not null,
     job_id number(12) not null,
     salary number(10),
     manager_id number(6),
     dept_id number(4));

Table created.

SQL> _
```

Figure 5 – 'Employees' table creation


C:\WINDOWS\system32\cmd.exe - sqlplus system/khalid as sysdba

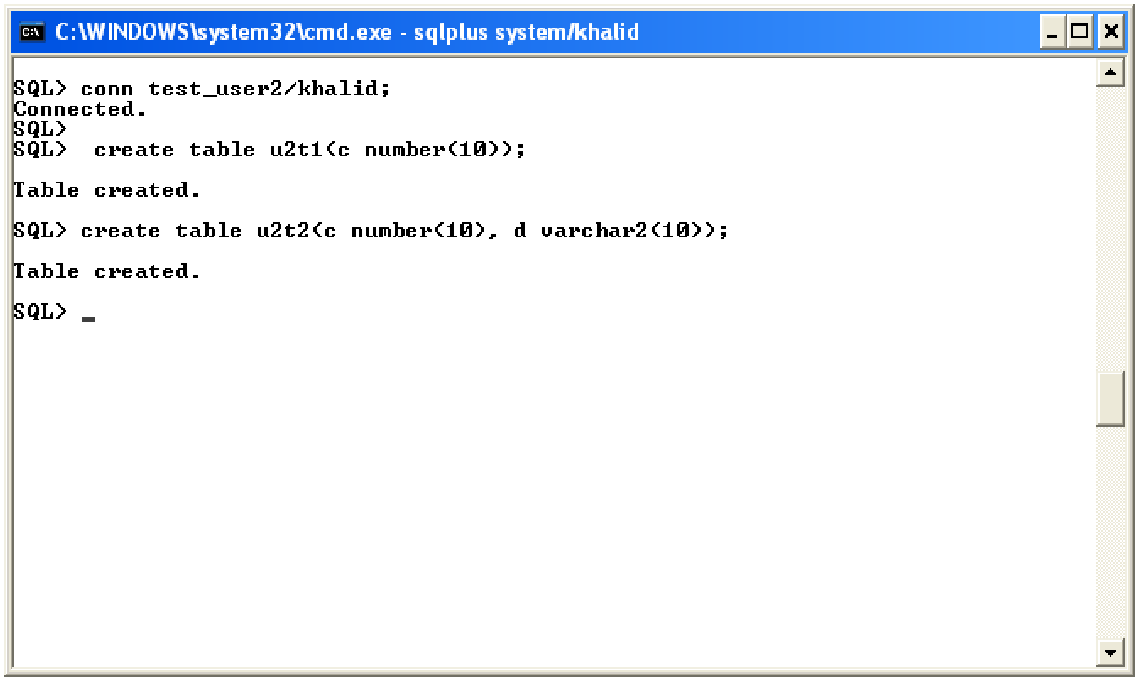
```
SQL> create table job_history(
     emp_id number(6) not null,
     start_date date not null,
     end_date date not null,
     job_id varchar(12) not null,
     dept_id number(4));

Table created.

SQL> _
```

Figure 6 – 'Job_history' table creation



```
SQL> conn test_user1/khalid;
Connected.
SQL>
SQL> create table u1t1(c number(10));

Table created.

SQL> create table u1t2(c number(10), d varchar2(10));

Table created.

SQL> _
```

Figure 7 – Test tables' creation into test user1



```
SQL> conn test_user2/khalid;
Connected.
SQL>
SQL>  create table u2t1(c number(10));

Table created.

SQL> create table u2t2(c number(10), d varchar2(10));

Table created.

SQL> _
```

Figure 8 – Test tables' creation into test user2

APPENDIX B

The Migration

1 About EnterpriseDB

EnterpriseDB is the leading provider of enterprise class products and services based on PostgreSQL, the world's most advanced open source database. The company's Postgres Plus products are ideally suited for transaction-intensive applications requiring superior performance, massive scalability, and compatibility with proprietary database products. PostgresPlus also provides an economical open source alternative or complement to proprietary databases without sacrificing features or quality.

EnterpriseDB has offices in North America, Europe, and Asia. The company was founded in 2004 and is headquartered in Edison, N.J. For more information, please call +1-732-331-1300 or visit http://www.enterprisedb.com.

2 The Migration from Oracle to Postgres

2.1 Installing Migration Studio

Migration Studio is distributed with PostgresPlus Advanced Server. You can download the latest version of PostgresPlus Advanced Server at:

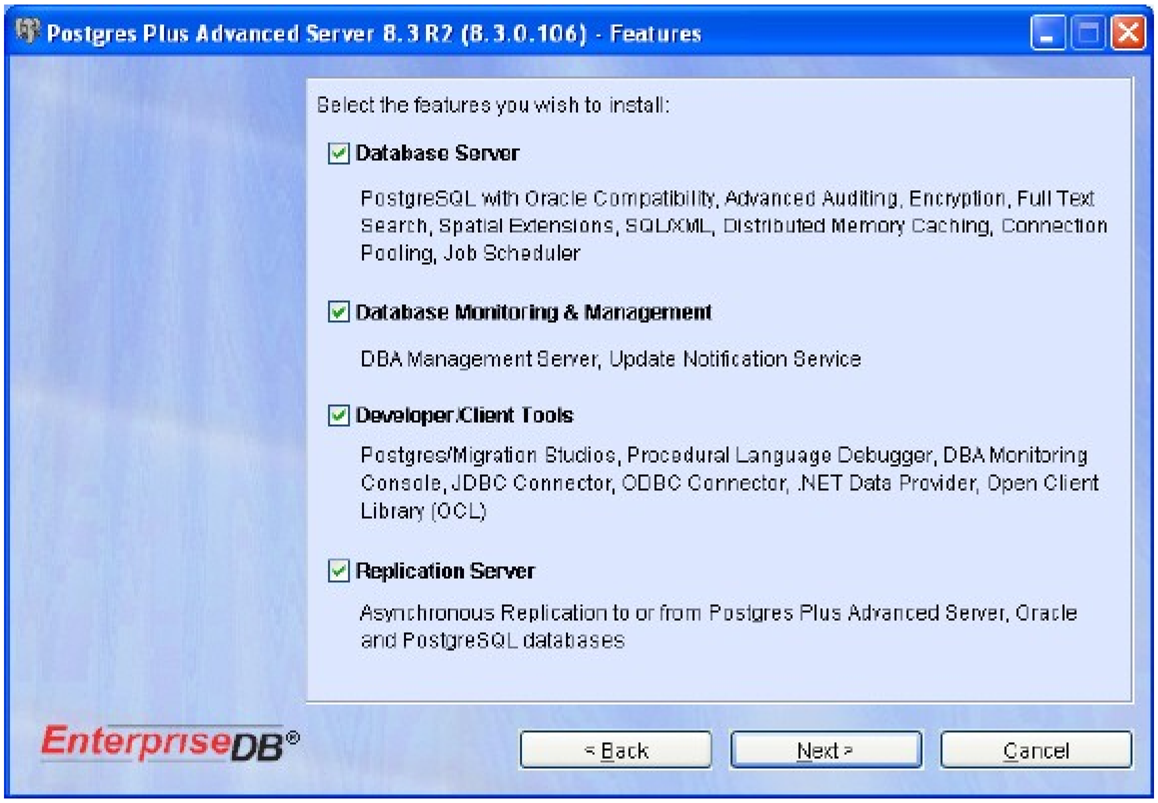
http://www.enterprisedb.com/products/download.do.

Choose the version that is compatible with your system, and click the Download link. Complete the registration information, and click Submit to start the download. Extract the installation folder from the downloaded archive.

- If you are installing into Windows, navigate to the installer, and double click the PostgresPlus Advanced Server icon to start the installation wizard.

- If you are installing into Linux, open a command window, and navigate into the pgplus-advsvr-linux-x86_830106 directory. Give yourself super user privileges, and then start the installation wizard with the command $sh pgplus-advsvr-linux-x86_830106.bin.

Follow the on-screen directions, choosing the appropriate responses, and clicking Next to progress through the installation. When the Features dialog opens, make sure the box next to the Developer/Client Tools option is checked to include the Migration Studio Graphical tool in the installation (shown in Figure 4.1). Click Next to continue.


Postgres Plus Advanced Server 8.3 R2 (8.3.0.106) - Features

Select the features you wish to install:

[✓] Database Server

PostgreSQL with Oracle Compatibility, Advanced Auditing, Encryption, Full Text Search, Spatial Extensions, SQL/XML, Distributed Memory Caching, Connection Pooling, Job Scheduler

[✓] Database Monitoring & Management

DBA Management Server, Update Notification Service

[✓] Developer/Client Tools

Postgres/Migration Studios, Procedural Language Debugger, DBA Monitoring Console, JDBC Connector, ODBC Connector, .NET Data Provider, Open Client Library (OCL)

[✓] Replication Server

Asynchronous Replication to or from Postgres Plus Advanced Server, Oracle and PostgreSQL databases

Figure 1 - Advanced Server Installation Dialog

Continue through the dialogs until the installation completes. Postgres Plus Advanced Server should now appear on the start menu.

You must install a JDBC driver before migrating from an Oracle or MySQL server. You can find a link to the appropriate driver in the Third Party Drivers section of the EnterpriseDB downloads page. Download the driver file, and move it into the \jre\lib\ext\ directory under the Postgres Plus Advanced Server home directory.

JDBC drivers for Sybase and SQL Server are distributed and installed with Advanced Server.

See figures 2 and 3 below.

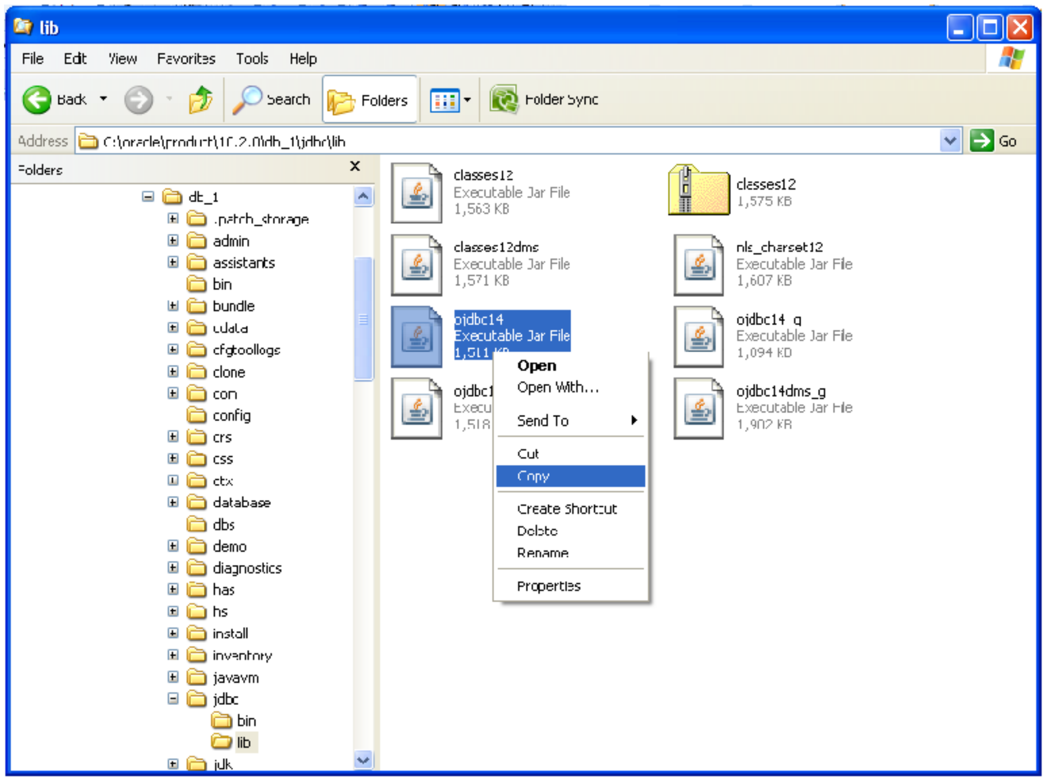

lib
File Edit View Favorites Tools Help
Back Search Folders Folder Sync
Address C:\oracle\product\10.2.0\db_1\jdbc\lib Go
Folders
db_1
.patch_storage
admin
assistants
bin
bundle
cdata
cfgtoollogs
clone
con
config
crs
css
ctx
database
dbs
demo
diagnostics
has
hs
install
inventory
javavm
jdbc
bin
lib
jdk
classes12 Executable Jar File 1,563 KB
classes12 1,575 KB
classes12dms Executable Jar File 1,571 KB
nls_charset12 Executable Jar File 1,607 KB
ojdbc14 Executable Jar File 1,511 KB
ojdbc14_g Executable Jar File 1,094 KB
ojdbc14dms Executable Jar File 1,518 KB
ojdbc14dms_g Executable Jar File 1,902 KB
Open
Open With...
Send To
Cut
Copy
Create Shortcut
Delete
Rename
Properties

Figure 2 – Copying Oracle JDBC Driver from Oracle Home

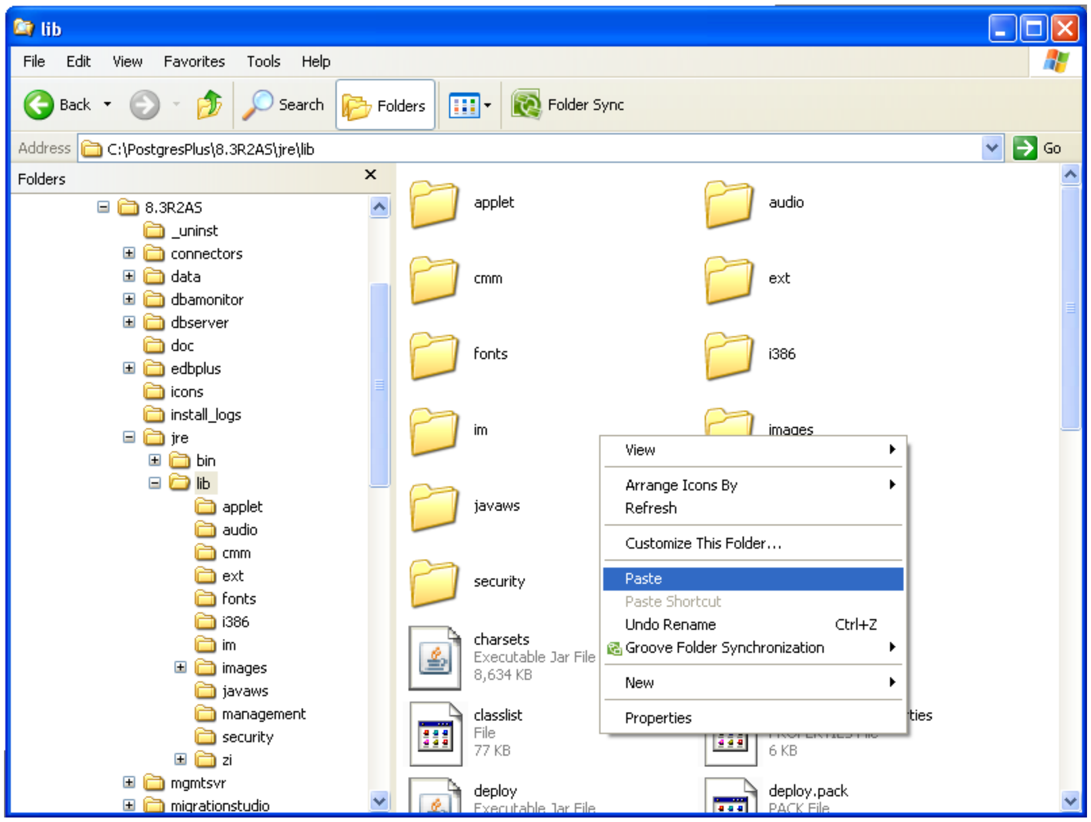
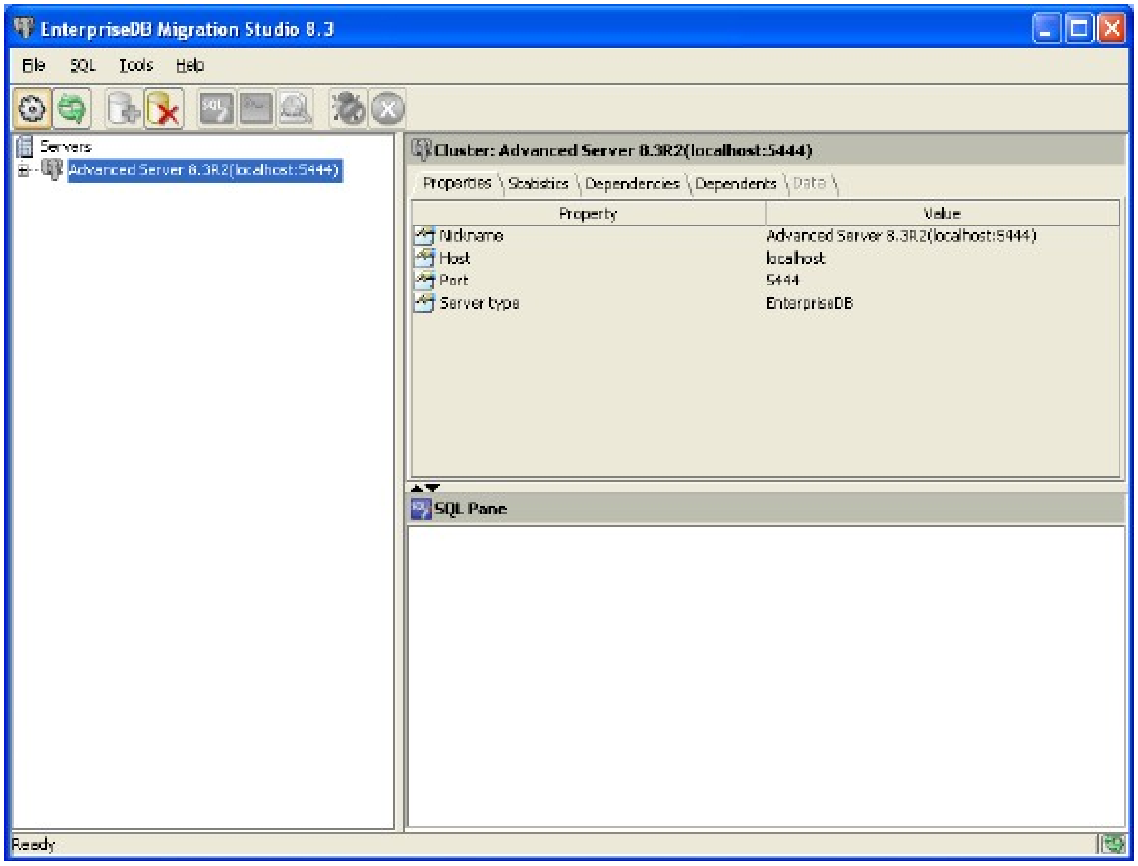


Figure 3 - Locating Oracle JDBC Driver into jre Directory of PostgresPlus

To run Migration Studio, open the start menu and select PostgresPlus Advanced Server 8.3R2; choose Migration Studio from the pull-beside menu to open the EnterpriseDB Migration Studio 8.3 window, as shown in Figure 2.


EnterpriseDB Migration Studio 8.3
File
SQL
Tools
Help
Servers
Advanced Server 8.3R2(localhost:5444)
Cluster: Advanced Server 8.3R2(localhost:5444)
Properties
Statistics
Dependencies
Dependents
Data
SQL Pane
Ready

Property	Value
Nickname	Advanced Server 8.3R2(localhost:5444)
Host	localhost
Port	5444
Server type	EnterpriseDB

Figure 4 - EnterpriseDB Migration Studio 8.3

Alternatively, you can start Migration Studio by opening a Command window and navigating to the migration studio directory under the current installation of PostgresPlus. Enter the command: runMigrationStudio.bat to open the Migration Studio window.

2.2 Connecting an Application to Advanced Server

In the case of a Java application, change the `JDBC` driver name (`Class.forName`) and `JDBC` URL.

A Java application running on Oracle might have the following connection properties:

```
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con =

DriverManager.getConnection("jdbc:oracle:thin:@localhost:1521:x
e",
                                "user",
                                "password")
```

Change the connection string to connect to an instance of Advanced Server:

```
Class.forName("com.edb.Driver")
Connection con =
   DriverManager.getConnection("jdbc:edb://localhost:5444/edb",
                               "user",
                               "password");
```

1. Use an `ODBC` data source administrator to create a data source that defines the connection properties for the Advanced Server database.

   Most Linux and Windows systems include graphical tools that allow you to create and edit `ODBC data sources`. After installing `ODBC`, check the Administrative Tools menu for a link to the `ODBC Data Source Administrator`. Click the Add button to start the `Create New Data Source` wizard; complete the dialogs to define the Advanced Server data source.

2. Change the application to use the new data source.

   The application will contain a call to `SQLConnect` (or possibly `SQLDriverConnect`); edit the invocation to change the data source name. In the following example, the data source is `"OracleDSN"`:

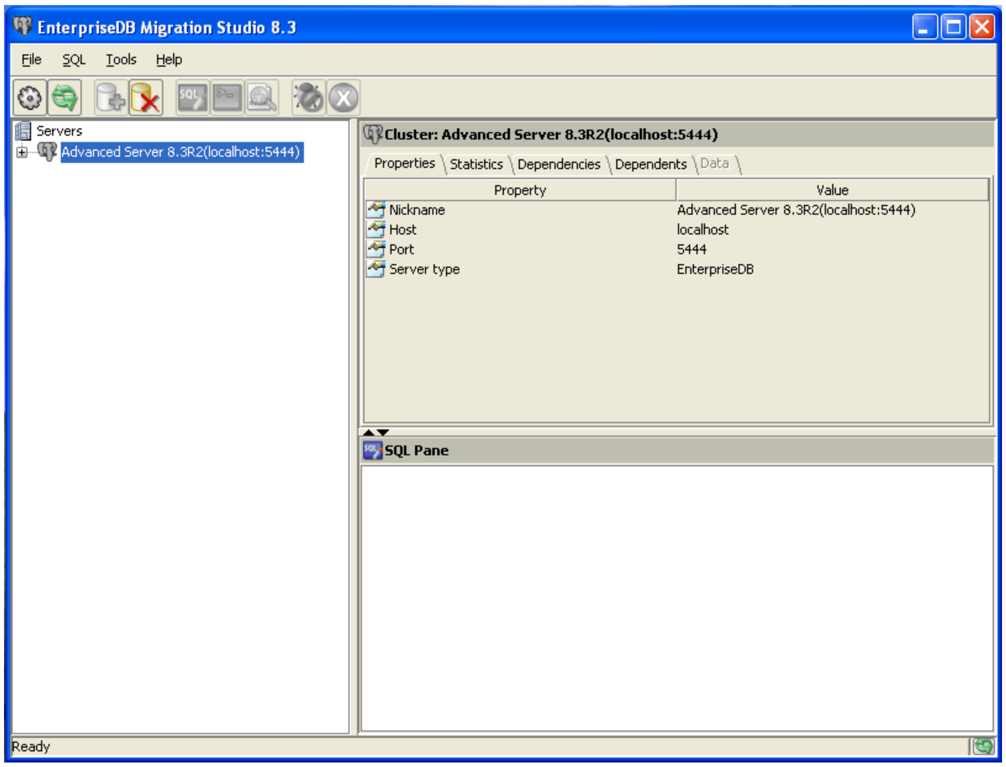
   ```
   result = SQLConnect(conHandle,           // Connection
   handle (returned)
               "OracleDSN", SQL_NTS,        // Data source
   name
               username, SQL_NTS,           // User name
               password, SQL_NTS);          // Password
   ```

   To connect to an instance of Advanced Server defined in a data source named "`AdvServerDSN`", change the data source name:

   ```
   result = SQLConnect(conHandle,           // Connection
   handle (returned)
               "AdvServerDSN", SQL_NTS,     // Data source
   name
               username, SQL_NTS,           // User name
               password, SQL_NTS);          // Password
   ```

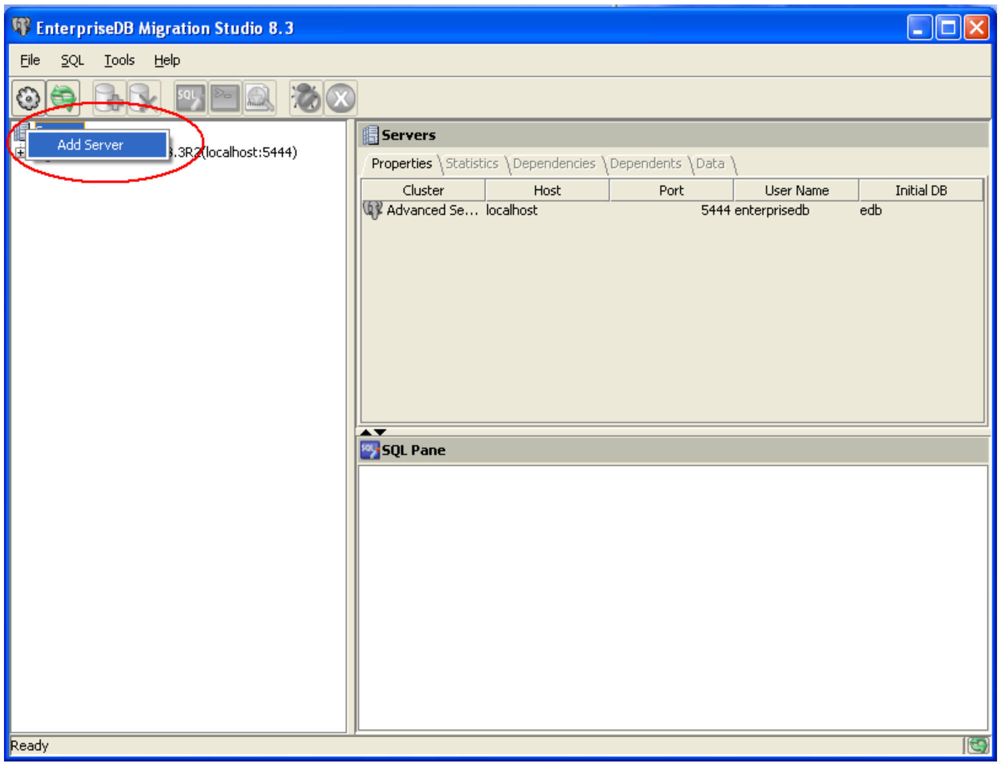
2.3 Severs Creation

These screen shots present the steps could be walked through to create an Oracle server. The same steps could be followed to create an EnterpriseDB server.


EnterpriseDB Migration Studio 8.3
File SQL Tools Help
Servers
Advanced Server 8.3R2(localhost:5444)
Cluster: Advanced Server 8.3R2(localhost:5444)
Properties Statistics Dependencies Dependents Data
SQL Pane
Ready

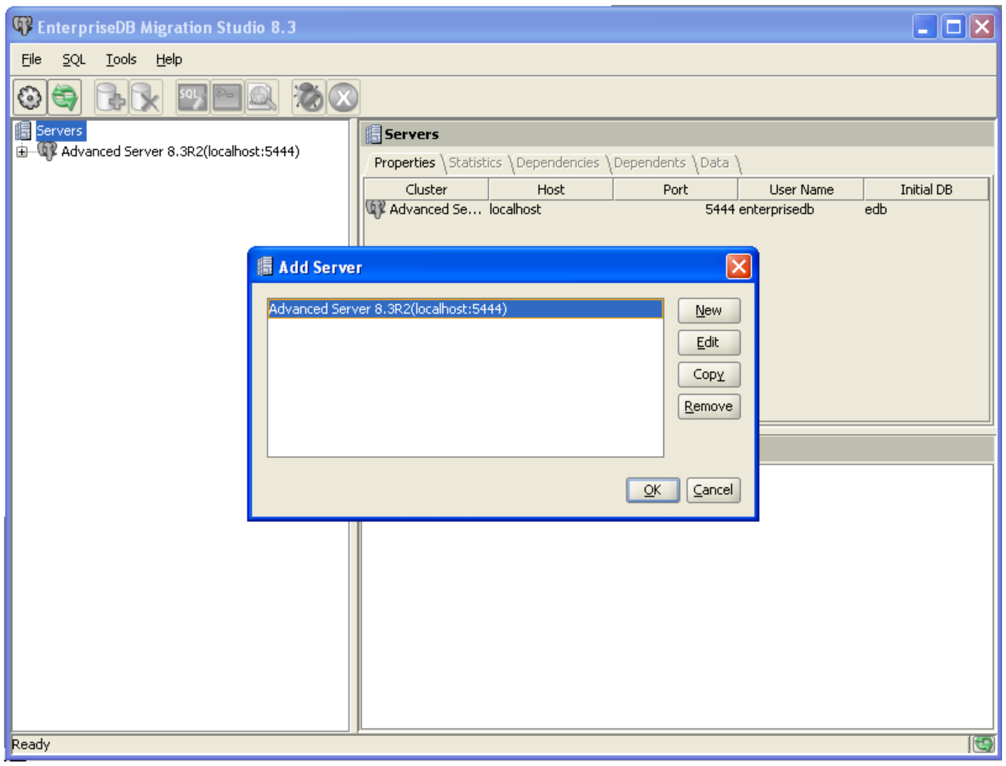
Property	Value
Nickname	Advanced Server 8.3R2(localhost:5444)
Host	localhost
Port	5444
Server type	EnterpriseDB

Figure 5 – EnterpriseDB migration studio 8.3 main menu


EnterpriseDB Migration Studio 8.3
File SQL Tools Help
Add Server
.3R2(localhost:5444)
Servers
Properties Statistics Dependencies Dependents Data
SQL Pane
Ready

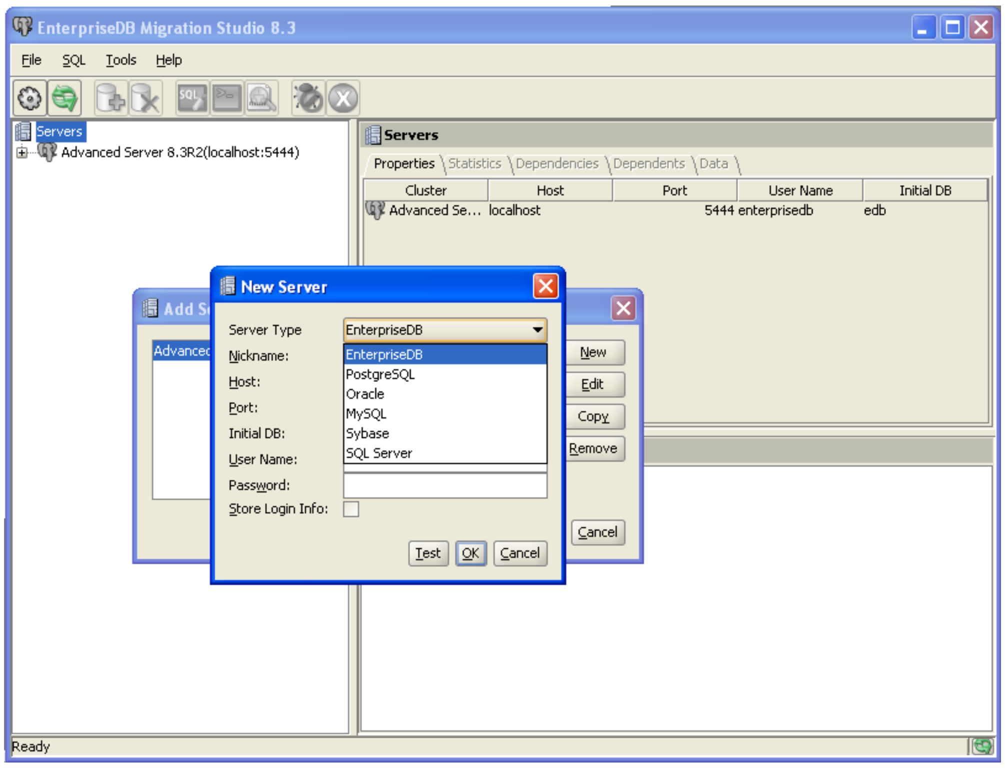
Cluster	Host	Port	User Name	Initial DB
Advanced Se...	localhost	5444	enterprisedb	edb

Figure 6 – EnterpriseDB migration studio 8.3, add new server


EnterpriseDB Migration Studio 8.3
File SQL Tools Help
Servers
Advanced Server 8.3R2(localhost:5444)
Servers
Properties Statistics Dependencies Dependents Data
Add Server
Advanced Server 8.3R2(localhost:5444)
New
Edit
Copy
Remove
OK
Cancel
Ready

Cluster	Host	Port	User Name	Initial DB
Advanced Se…	localhost	5444	enterprisedb	edb

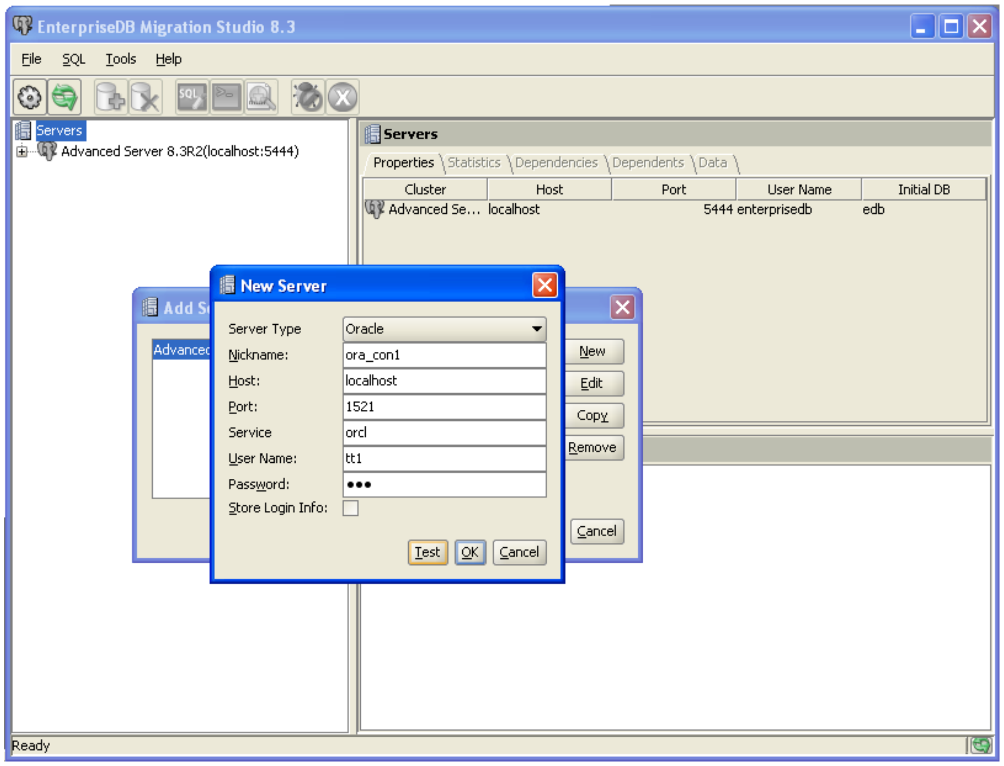
Figure 7 – EnterpriseDB migration studio 8.3, add new server dialog box



Cluster	Host	Port	User Name	Initial DB
Advanced Se…	localhost	5444	enterprisedb	edb

Server Type: EnterpriseDB
Nickname:
Host:
Port:
Initial DB:
User Name:
Password:
Store Login Info: ☐

Figure 8 – EnterpriseDB migration studio 8.3, select the server's type

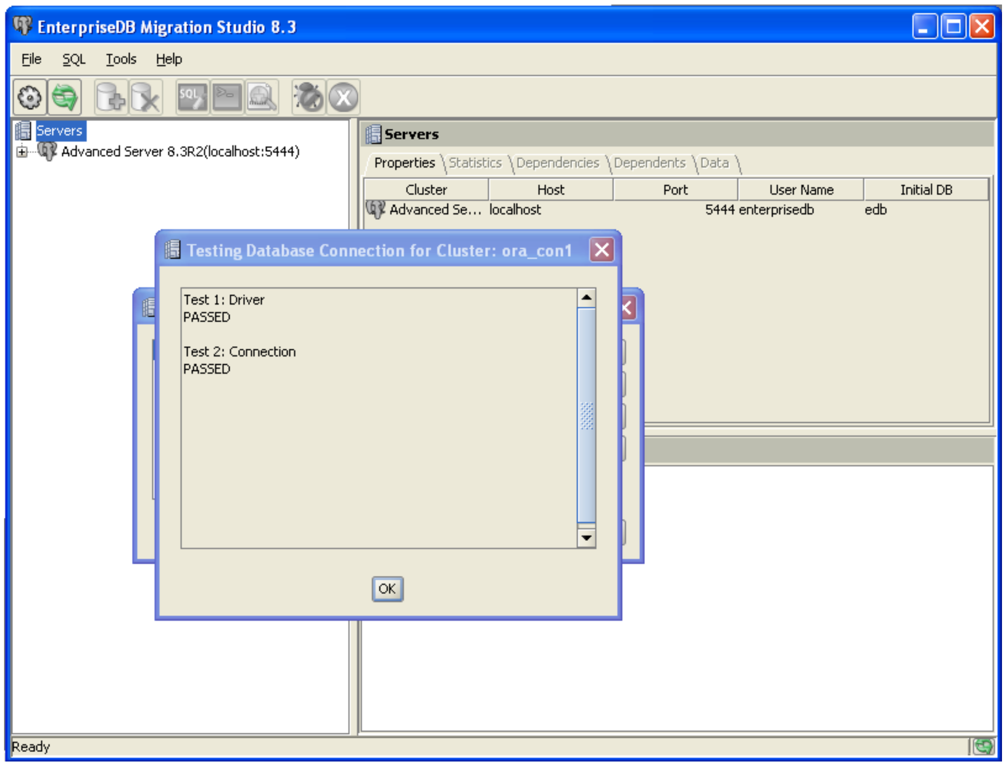


Cluster	Host	Port	User Name	Initial DB
Advanced Se...	localhost	5444	enterprisedb	edb

New Server

Server Type	Oracle
Nickname:	ora_con1
Host:	localhost
Port:	1521
Service	orcl
User Name:	tt1
Password:	•••
Store Login Info:	☐

Figure 9 – EnterpriseDB migration studio 8.3 set the server information

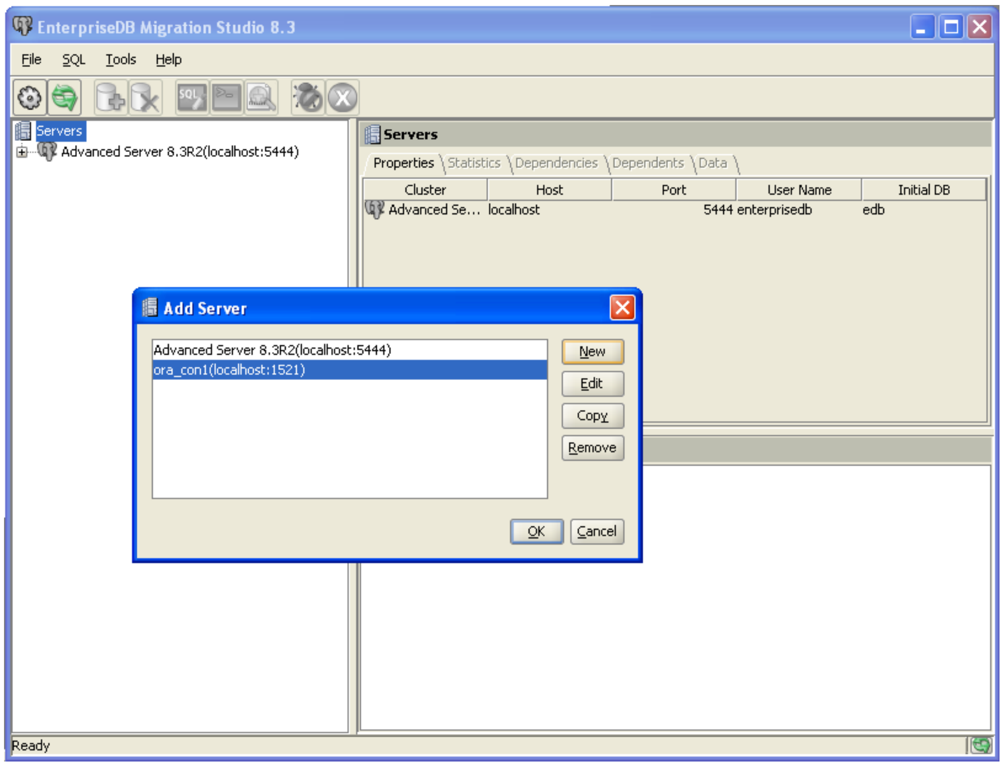


Cluster	Host	Port	User Name	Initial DB
Advanced Se...	localhost	5444	enterprisedb	edb

Testing Database Connection for Cluster: ora_con1

```
Test 1: Driver
PASSED

Test 2: Connection
PASSED
```

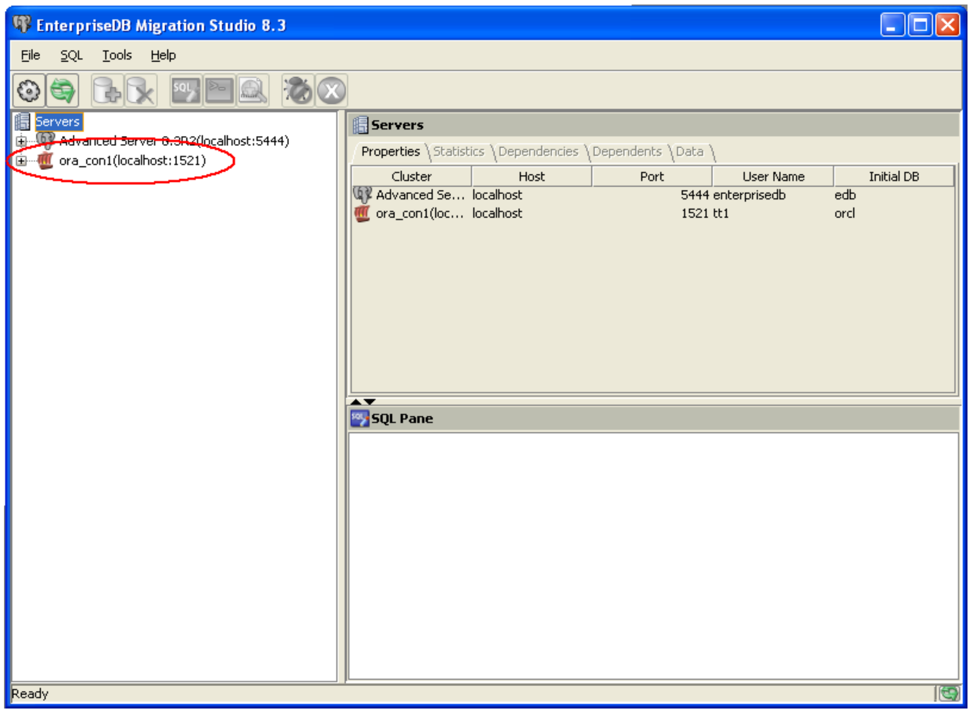
Figure 10 – EnterpriseDB migration studio 8.3, test the created server


EnterpriseDB Migration Studio 8.3
File SQL Tools Help
Servers
Advanced Server 8.3R2(localhost:5444)
Servers
Properties Statistics Dependencies Dependents Data
Add Server
New
Edit
Copy
Remove
OK
Cancel
Ready

Cluster	Host	Port	User Name	Initial DB
Advanced Se…	localhost	5444	enterprisedb	edb

Advanced Server 8.3R2(localhost:5444)
ora_con1(localhost:1521)

Figure 11 – EnterpriseDB migration studio 8.3, new server is ready to be added

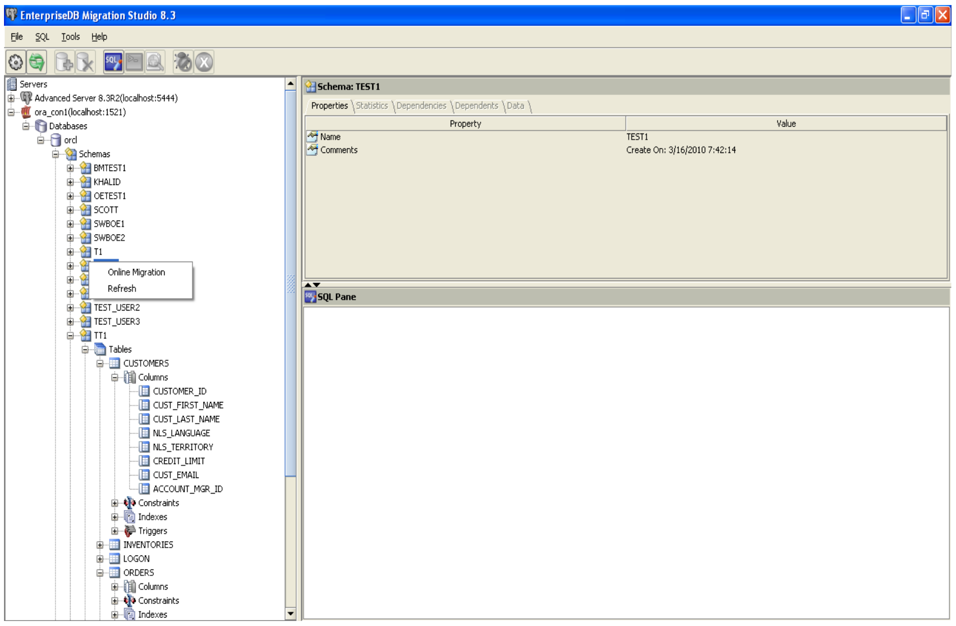

EnterpriseDB Migration Studio 8.3
File SQL Tools Help
Servers
Advanced Server 8.3R2(localhost:5444)
ora_con1(localhost:1521)
Servers
Properties Statistics Dependencies Dependents Data
SQL Pane
Ready

Cluster	Host	Port	User Name	Initial DB
Advanced Se…	localhost	5444	enterprisedb	edb
ora_con1(loc…	localhost	1521	tt1	orcl

Figure 12 – EnterpriseDB migration studio 8.3, new server has been added

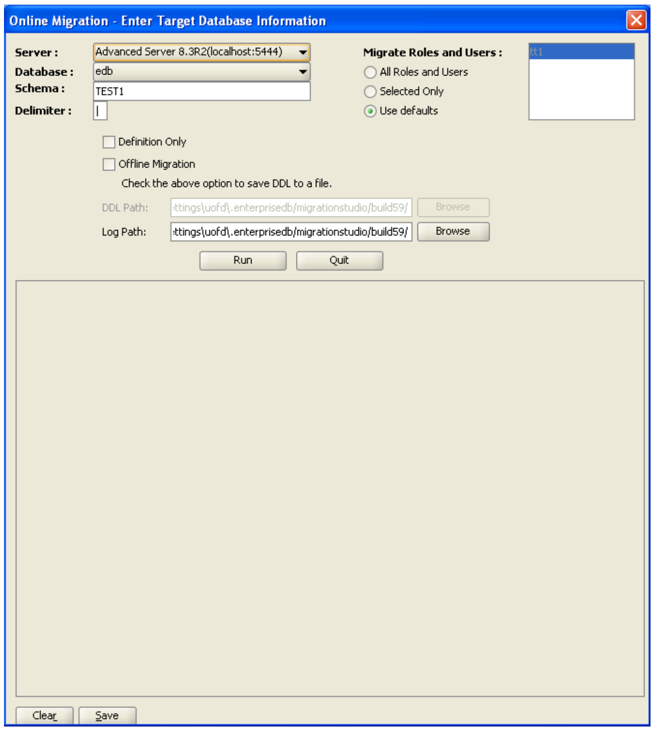
2.4 Online Migration

The screenshots below show how the online migration steps are accomplished.



Property	Value
Name	TEST1
Comments	Create On: 3/16/2010 7:42:14

Figure 13 – Right click an object then click online migration



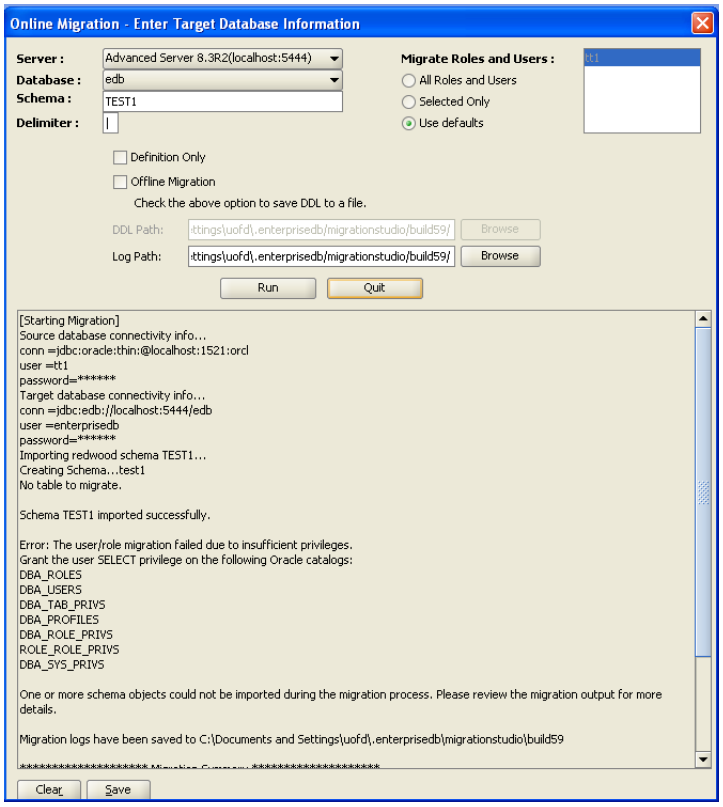
Server : Advanced Server 8.3R2(localhost:5444)
Database : edb
Schema : TEST1
Delimiter : |

Migrate Roles and Users :
All Roles and Users [ ]
Selected Only [ ]
Use defaults [✓]

[ ] Definition Only
[ ] Offline Migration
Check the above option to save DDL to a file.

DDL Path: :ttings\uofd\.enterprisedb/migrationstudio/build59/
Log Path: :ttings\uofd\.enterprisedb/migrationstudio/build59/

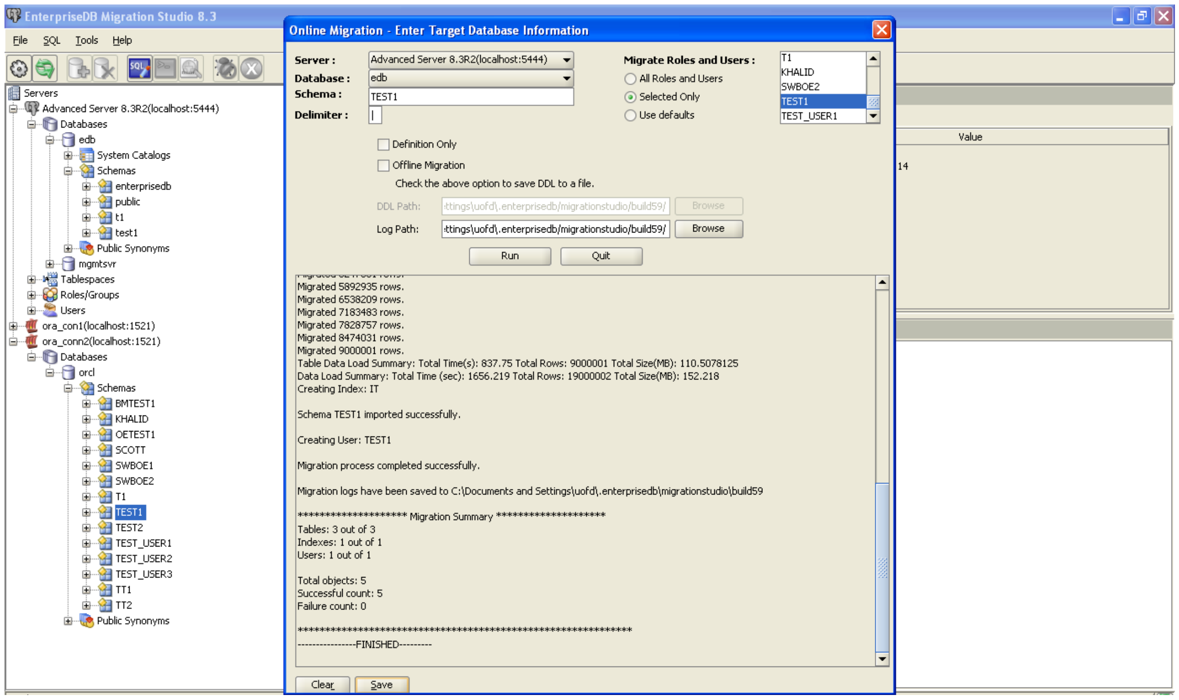
Figure 14 – Online migration dialog box



Server : Advanced Server 8.3R2(localhost:5444)
Database : edb
Schema : TEST1
Delimiter : |
Migrate Roles and Users : All Roles and Users / Selected Only / [✓ Use defaults]
tt1
Definition Only [ ]
Offline Migration [ ]
Check the above option to save DDL to a file.
DDL Path: :ttings\uofd\.enterprisedb/migrationstudio/build59/
Log Path: :ttings\uofd\.enterprisedb/migrationstudio/build59/

```
[Starting Migration]
Source database connectivity info...
conn =jdbc:oracle:thin:@localhost:1521:orcl
user =tt1
password=******
Target database connectivity info...
conn =jdbc:edb://localhost:5444/edb
user =enterprisedb
password=******
Importing redwood schema TEST1...
Creating Schema...test1
No table to migrate.

Schema TEST1 imported successfully.

Error: The user/role migration failed due to insufficient privileges.
Grant the user SELECT privilege on the following Oracle catalogs:
DBA_ROLES
DBA_USERS
DBA_TAB_PRIVS
DBA_PROFILES
DBA_ROLE_PRIVS
ROLE_ROLE_PRIVS
DBA_SYS_PRIVS

One or more schema objects could not be imported during the migration process. Please review the migration output for more
details.

Migration logs have been saved to C:\Documents and Settings\uofd\.enterprisedb\migrationstudio\build59
```

Figure 15 – After running online migration (whole T1 user)



Server : Advanced Server 8.3R2(localhost:5444)
Database : edb
Schema : TEST1
Delimiter : |
Migrate Roles and Users : All Roles and Users / [✓ Selected Only] / Use defaults
T1
KHALID
SWBOE2
TEST1
TEST_USER1
Definition Only [ ]
Offline Migration [ ]
Check the above option to save DDL to a file.
DDL Path: :ttings\uofd\.enterprisedb/migrationstudio/build59/
Log Path: :ttings\uofd\.enterprisedb/migrationstudio/build59/

```
Migrated 5892935 rows.
Migrated 6538209 rows.
Migrated 7183483 rows.
Migrated 7828757 rows.
Migrated 8474031 rows.
Migrated 9000001 rows.
Table Data Load Summary: Total Time(s): 837.75 Total Rows: 9000001 Total Size(MB): 110.5078125
Data Load Summary: Total Time (sec): 1656.219 Total Rows: 19000002 Total Size(MB): 152.218
Creating Index: IT

Schema TEST1 imported successfully.

Creating User: TEST1

Migration process completed successfully.

Migration logs have been saved to C:\Documents and Settings\uofd\.enterprisedb\migrationstudio\build59

******************** Migration Summary ********************
Tables: 3 out of 3
Indexes: 1 out of 1
Users: 1 out of 1

Total objects: 5
Successful count: 5
Failure count: 0

************************************************************
----------------FINISHED---------
```

Figure 16 –User T1 has been successfully migrated

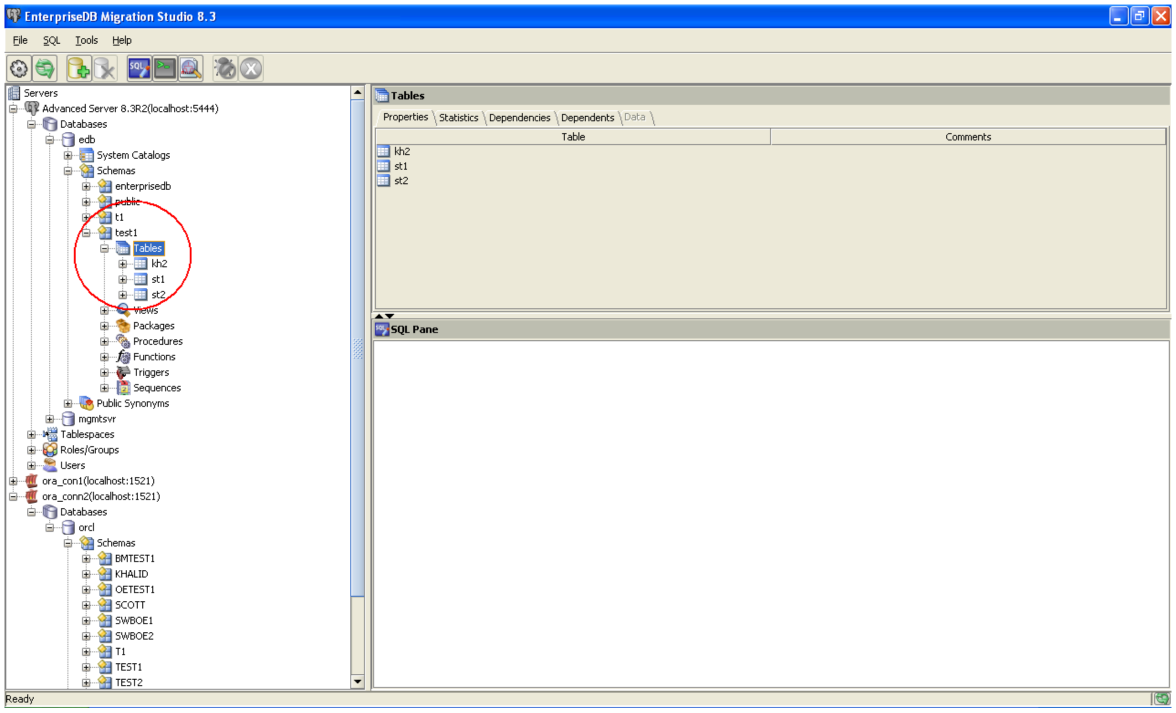
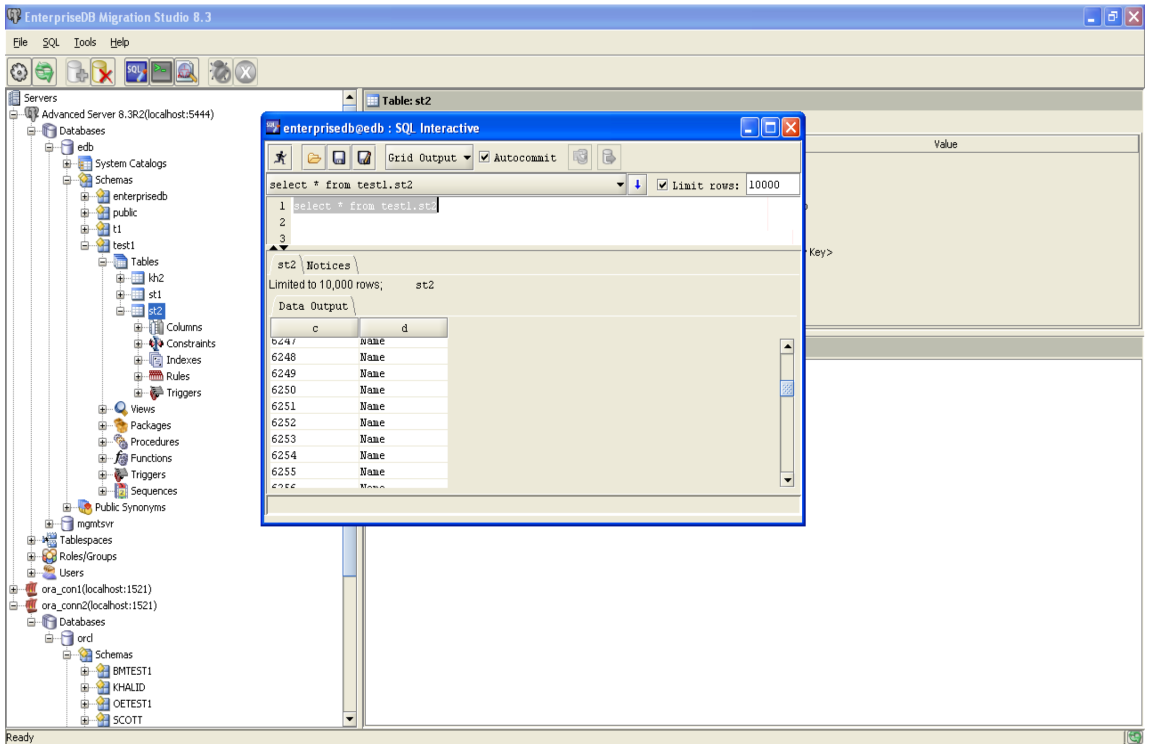


Table	Comments
kh2	
st1	
st2	

Figure 17 – The objects of user T1 could be appeared into Postgres Advanced Server



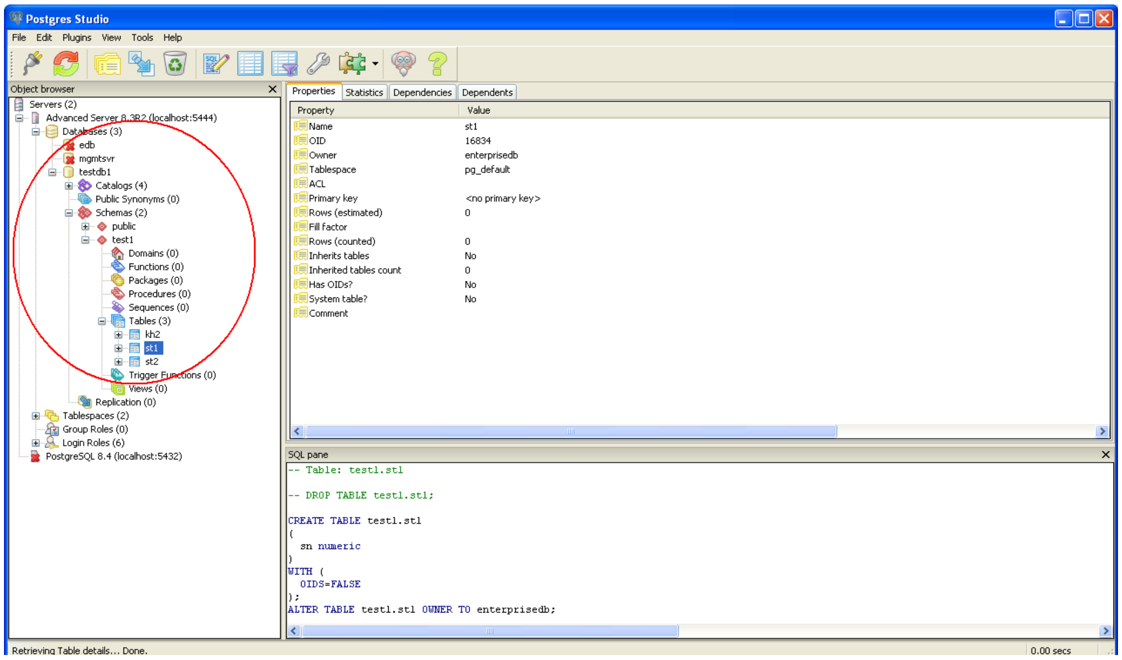
```
select * from test1.st2
```

Limit rows: 10000

Limited to 10,000 rows; st2

c	d
6247	Name
6248	Name
6249	Name
6250	Name
6251	Name
6252	Name
6253	Name
6254	Name
6255	Name
6256	Name

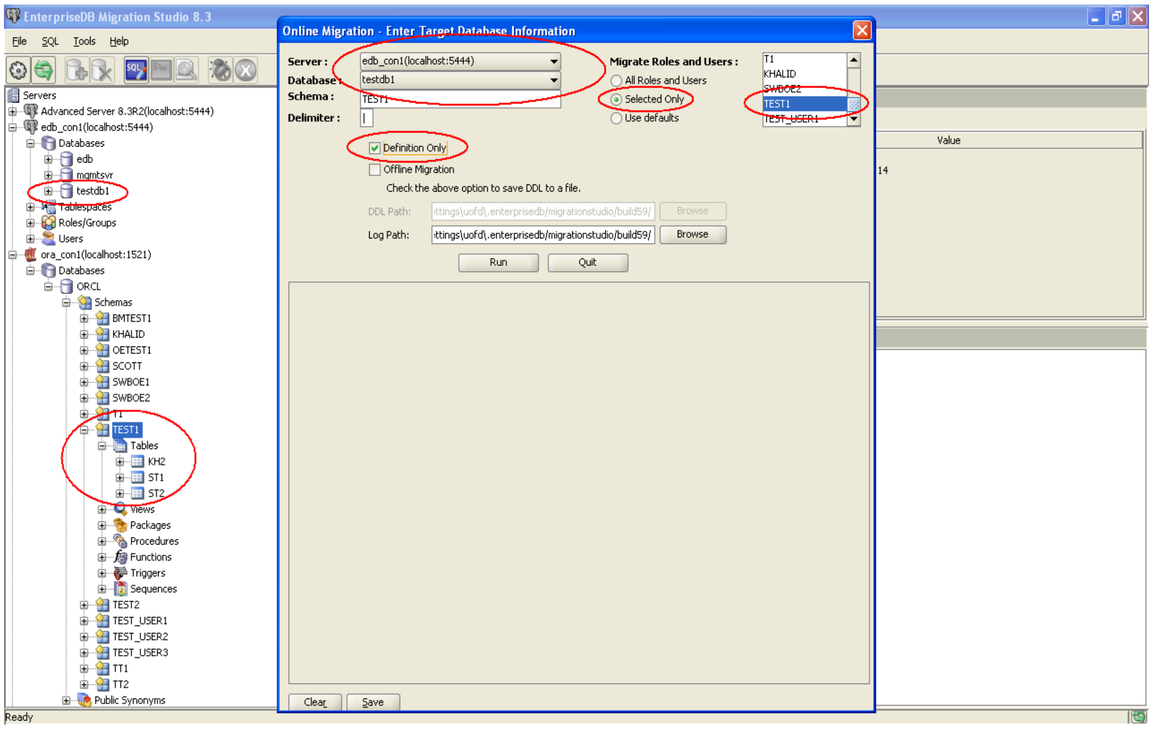
Figure 18 – Manipulation of user T1 in Postgres Advanced Server



Property	Value
Name	st1
OID	16834
Owner	enterprisedb
Tablespace	pg_default
ACL	
Primary key	<no primary key>
Rows (estimated)	0
Fill factor	
Rows (counted)	0
Inherits tables	No
Inherited tables count	0
Has OIDs?	No
System table?	No
Comment	

```
-- Table: test1.st1

-- DROP TABLE test1.st1;

CREATE TABLE test1.st1
(
  sn numeric
)
WITH (
  OIDS=FALSE
);
ALTER TABLE test1.st1 OWNER TO enterprisedb;
```

Figure 19 –Migrated user T1 in Postgres environment



Server : edb_con1(localhost:5444)
Database : testdb1
Schema : TEST1
Delimiter :

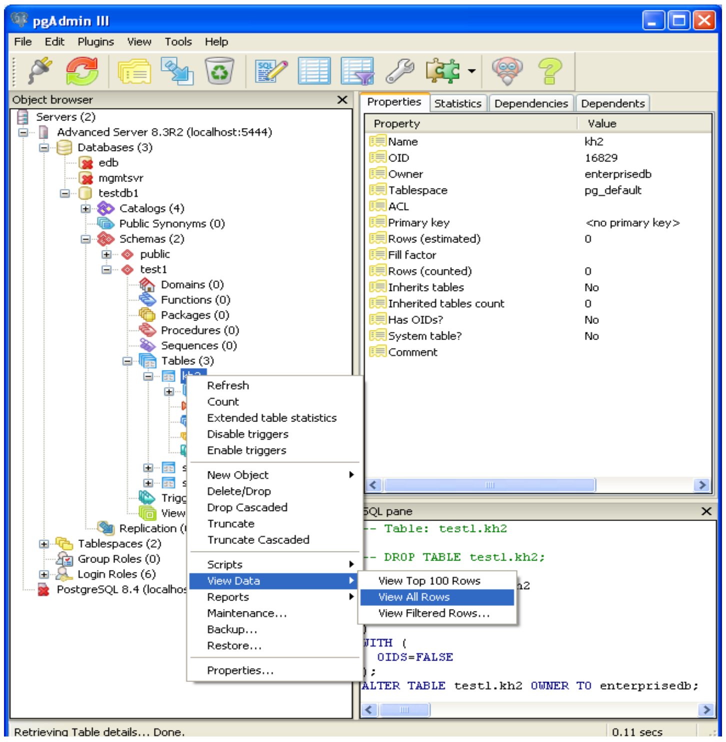
Migrate Roles and Users : T1, KHALID, SWBOE2, TEST1, TEST_USER1

All Roles and Users [✓ Selected Only] Use defaults

[✓ Definition Only]
Offline Migration
Check the above option to save DDL to a file.

DDL Path: ttings\uofd\.enterprisedb/migrationstudio/build59/
Log Path: ttings\uofd\.enterprisedb/migrationstudio/build59/

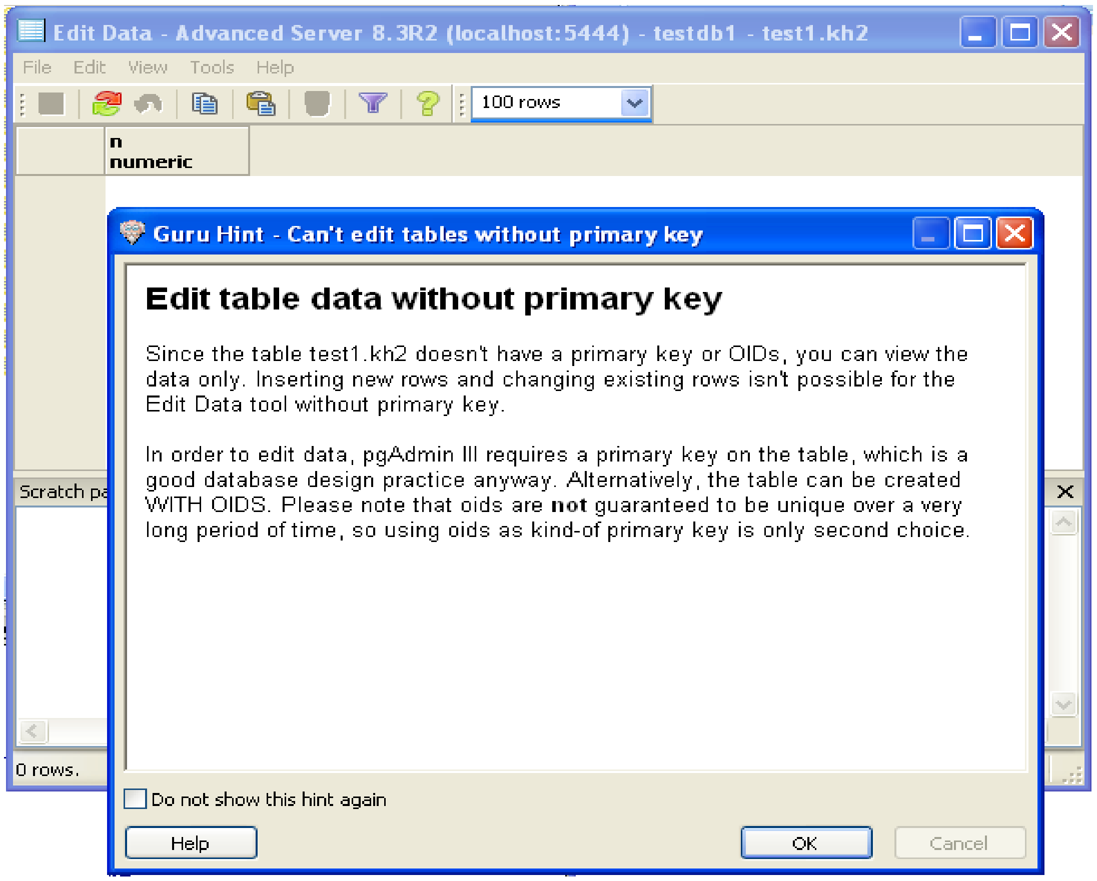
Figure 20 – Online migration, migrate definition only



Property	Value
Name	kh2
OID	16829
Owner	enterprisedb
Tablespace	pg_default
ACL	
Primary key	<no primary key>
Rows (estimated)	0
Fill factor	
Rows (counted)	0
Inherits tables	No
Inherited tables count	0
Has OIDs?	No
System table?	No
Comment	

```
-- Table: test1.kh2

-- DROP TABLE test1.kh2;

WITH (
  OIDS=FALSE
);
ALTER TABLE test1.kh2 OWNER TO enterprisedb;
```

Figure 21 – Manipulation of migrated user in pgAdmin (view data)


Edit Data - Advanced Server 8.3R2 (localhost:5444) - testdb1 - test1.kh2
File Edit View Tools Help
100 rows
n
numeric
Scratch pa
0 rows.
Guru Hint - Can't edit tables without primary key
Do not show this hint again
Help
OK
Cancel

Edit table data without primary key

Since the table test1.kh2 doesn't have a primary key or OIDs, you can view the data only. Inserting new rows and changing existing rows isn't possible for the Edit Data tool without primary key.

In order to edit data, pgAdmin III requires a primary key on the table, which is a good database design practice anyway. Alternatively, the table can be created WITH OIDS. Please note that oids are **not** guaranteed to be unique over a very long period of time, so using oids as kind-of primary key is only second choice.

Figure 22 – Inability to view the data of migrated user, primary key recommendation

2.5 Some Conflicted Features in Postgres

ASM is the ability of the database to act as its own volume management system. Postgres doesn’t have this and relies on the volume management system of the hardware for this functionality.

Table compression can be accomplished by putting those tables in a tablespace that resides on a compressed file system. This is supported by Postgres.

Advanced Queuing, although not built into the database can be and has been worked around using external messaging systems such as ActiveMQ, TIBCO® or MQ Series so those are options for you if you use AQ.

External tables will need to be loaded into staging tables in the database.

Using EnterpriseDB’s EDB*Loader tool to load the data quickly is the recommended approach.

Materialized views exist in the form of summary tables that can be maintained by triggers, similar to the Oracle implementation but the setup is manual and not Oracle compatible. Automatic query rewrite is not currently supported so your application will need to be made aware of the summary table’s existence.

Analytic Functions like lag, lead and dense_rank are not supported in the 8.3x releases of PostgresPlus Advanced Server. These have been introduced in the PostgreSQL 8.4 release so they will be available in the 8.4 release of Postgres Plus Advanced Server.

If errors are encountered during migration, EnterpriseDB can be quickly notified by emailing them at migrations@enterprisedb.com. They are continuously enhancing their compatibility and input from customers is invaluable in helping us prioritize our development plans and helping customers troubleshoot new issues.

APPENDIX C

Oracle AWR

1 AWR Steps

This section illustrates the steps necessary for Creating Snapshots, Dropping Snapshots, and Modifying Snapshot Settings.

1.1 Creating Snapshots

Snapshots can manually create with the `CREATE_SNAPSHOT` procedure to capture statistics at times different than those of the automatically generated snapshots. For example:

```
BEGIN
  DBMS_WORKLOAD_REPOSITORY.CREATE_SNAPSHOT ();
END;
/
```

In this example, a snapshot for the instance is created immediately with the flush level specified to the default flush level of `TYPICAL`. You can view this snapshot in the `DBA_HIST_SNAPSHOT` view.

Steps in the sample database:

1. Connect to Oracle as system administrator and grant DBA to the two test users

   ```
   CONN sys/oracle AS SYSDBA
   GRANT DBA TO user_test1;
   ```

```
GRANT DBA TO user_test2;
```

2. Extract number of rows from the tested table, primarily

```
SELECT NUM_ROWS FROM DBA_TABLES WHERE TABLE_NAME LIKE
'U1T1';
```

3. Let the analyzer to analyze the table, by issuing the statement

```
ANALYZE TABLE TEST_USER1.U1T1 ESTIMATE STATISTICS;

ANALYZE TABLE TEST_USER1.U1T1 ESTIMATE STATISTICS FOR
ALL COLUMNS;
```

Or better use when table is small

```
ANALYZE TABLE TEST_USER1.U1T2 COMPUTE STATISTICS;

ANALYZE TABLE TEST_USER1.U1T2 COMPUTE STATISTICS FOR
ALL COLUMNS;
```

4. Again, extract the number of records by issuing the following statement

```
SELECT NUM_ROWS FROM DBA_TABLES WHERE TABLE_NAME LIKE
'U1T1';
```

5. Perform high insert activity

```
CONN AS USER_TEST2

CREATE TABLE U2T1(C NUMBER);

BEGIN

FOR I IN 1..10000000 LOOP

INSERT INTO U2T1 SELECT SID FROM V$MYSTAT WHERE
ROWNUM<2;

COMMIT;

DELETE U2T1 WHERE I IN (SELECT SID FROM V$MYSTAT
WHERE ROWNUM<2);
```

```
COMMIT;

END LOOP;

END;

/
```

OR:

```
CREATE TABLE U2T2 (N NUMBER);

BEGIN

FOR I IN 1..10000000 LOOP

INSERT  INTO  U2T2  SELECT  SID  FROM  V$MYSTAT  WHERE
ROWNUM<2;

COMMIT;

END LOOP;

END;

/

EXIT;

CONN AS USER_TEST1

CREATE TABLE U1T3 (I NUMBER);

DROP TABLE U1T1 CASCADE CONSTRAINTS;

CREATE TABLE U1T2(C NUMBER (10), D VARCHAR2(20));

CREATE INDEX IT ON U1T2(C);

INSERT INTO U1T2 VALUES (1);

COMMIT;

BEGIN

FOR I IN 1..900000 LOOP
```

```
INSERT INTO U1T2 VALUES (I,'INITIAL');

END LOOP;

END;

/
```

6. Simulate high CPU

```
CONN TEST_USER2

SELECT * FROM V$SESSION A, V$SESSION B, V$SESSION C;
```

1.2 AWR Steps and Results

1. Creating Snapshots:

```
CONN SYS/KHALID AS SYSDBA

BEGIN

  DBMS_WORKLOAD_REPOSITORY.CREATE_SNAPSHOT ();

END;

/
```

2. Dropping Snapshots:

```
SELECT DBID FROM V$DATABASE;
```

Then use the `DBID` in the next step

```
BEGIN

DBMS_WORKLOAD_REPOSITORY.DROP_SNAPSHOT_RANGE
(LOW_SNAP_ID  =>  899,  HIGH_SNAP_ID  =>  901,  DBID  =>
3492516897);

END;
```

```
/
```

3. Running Workload Repository Reports Using SQL Scripts:

   You can view AWR reports by running one of the SQL scripts such as the `awrrpt.sql` SQL script generates an HTML or text report that displays statistics for a range of snapshot Ids.

   Then choose the `SQL_ID` after that run the following script:

```
@?/RDBMS/ADMIN/AWRSQRPT.SQL
```

Parse Calls:

```
SET LINESIZE 100

SET PAGESIZE 100

SELECT * FROM

(SELECT SUBSTR (SQL_TEXT, 1, 40) SQL,

PARSE_CALLS, EXECUTIONS, HASH_VALUE, ADDRESS

FROM V$SQLAREA

WHERE PARSE_CALLS > 1000

ORDER BY PARSE_CALLS DESC)

WHERE ROWNUM <= 10;
```

Sharable Memory:

```
SELECT * FROM

(SELECT SUBSTR (SQL_TEXT, 1, 40) SQL,

SHARABLE_MEM, EXECUTIONS, HASH_VALUE, ADDRESS

FROM V$SQLAREA

WHERE SHARABLE_MEM > 1048576
ORDER BY SHARABLE_MEM DESC)

WHERE ROWNUM <= 10;
```

Version Count:

```
SELECT * FROM

(SELECT SUBSTR (SQL_TEXT, 1, 40) SQL, VERSION_COUNT,
EXECUTIONS, HASH_VALUE, ADDRESS FROM V$SQLAREA

WHERE VERSION_COUNT > 20

ORDER BY VERSION_COUNT DESC)

WHERE ROWNUM <= 10;
```

Buffer Gets:

```
SELECT * FROM

(SELECT SUBSTR (SQL_TEXT, 1, 40) SQL,

BUFFER_GETS,    EXECUTIONS,    BUFFER_GETS/EXECUTIONS
"GETS/EXEC",

HASH_VALUE, ADDRESS

FROM V$SQLAREA

WHERE BUFFER_GETS > 10000

ORDER BY BUFFER_GETS DESC)

WHERE ROWNUM <= 10;
```

1.3 Dropping Snapshots

You can drop a range of snapshots using the `DROP_SNAPSHOT_RANGE` procedure. To view a list of the snapshot `Ids` along with database `Ids`, check the `DBA_HIST_SNAPSHOT` view. For example, you can drop the following range of snapshots:

```
BEGIN
```

```
DBMS_WORKLOAD_REPOSITORY.DROP_SNAPSHOT_RANGE  (LOW_SNAP_ID
=>22, HIGH_SNAP_ID => 32, DBID => 3310949047);

END;

/
```

In the above example, the range of snapshot Ids to drop is specified from `22` to `32`. The optional database identifier is `3310949047`. If you do not specify a value for `DBID`, the local database identifier is used as the default value.

ASH that belongs to the time period specified by the snapshot range is also purged when the `DROP_SNAPSHOT_RANGE` procedure is called.

1.4 AWR Reports

You can view the AWR reports with Oracle Enterprise Manager or by running SQL scripts. To run an AWR report, a user must be granted the DBA role.

The reports are divided into multiple sections. The HTML report includes links that can be used to navigate quickly between sections. The content of the report contains the workload profile of the system for the selected range of snapshots.

Note:

If you run a report on a database that does not have any workload activity during the specified range of snapshots, calculated percentages for some report statistics can be less than 0 or greater than 100. This result simply means that there is no meaningful value for the statistic.

1.5 Running AWR Using SQL Scripts

AWR reports can view by running the following SQL script:

- The `awrrpt.sql` SQL script generates an HTML or text report that displays statistics for a range of snapshot Ids.

Running the awrrpt.sql report as follow:

To generate an HTML or text report for a range of snapshot Ids, run the `awrrpt.sql` script at the SQL prompt:

```
@$ORACLE_HOME/RDBMS/ADMIN/AWRRPT.SQL
```

```
First, you need to specify whether you want an HTML or a
text report.
```

```
ENTER VALUE FOR REPORT_TYPE: TEXT
```

```
Specify the number of days for which you want to list
snapshot Ids.
```

```
ENTER VALUE FOR NUM_DAYS: 2
```

After the list displays, you are prompted for the beginning and ending snapshot Id for the workload repository report.

```
ENTER VALUE FOR BEGIN_SNAP: 150
```

```
ENTER VALUE FOR END_SNAP: 160
```

Next, accept the default report name or enter a report name. The default name is accepted in the following example:

```
ENTER VALUE FOR REPORT_NAME:
```

```
USING THE REPORT NAME AWRRPT_1_150_160
```

```
The workload repository report is generated.
```

2 Managing Snapshot Data with APIs

While the primary interface for managing the AWR is the Oracle Enterprise Manager Database Control, monitoring functions can be managed with procedures in the `DBMS_WORKLOAD_REPOSITORY` package.

Snapshots are automatically generated for an Oracle database; however, you can use `DBMS_WORKLOAD_REPOSITORY` procedures to manually create, drop, and modify the snapshots that are used by automatic database diagnostic monitoring. Snapshots are sets of historical data for specific time periods that are used for performance comparisons. [4]

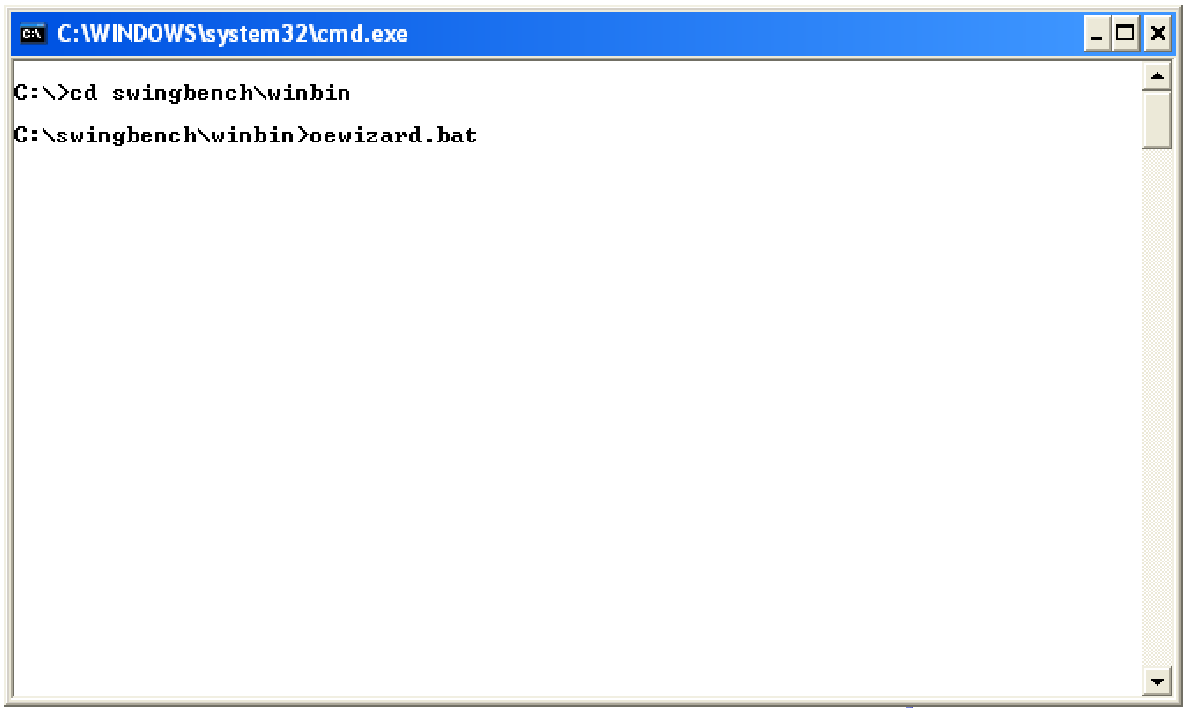
To invoke these procedures, a user must be granted the DBA role.

The steps necessary for Creating Snapshots, dropping Snapshots, and Modifying Snapshot Settings are placed in appendix C.

APPENDIX D

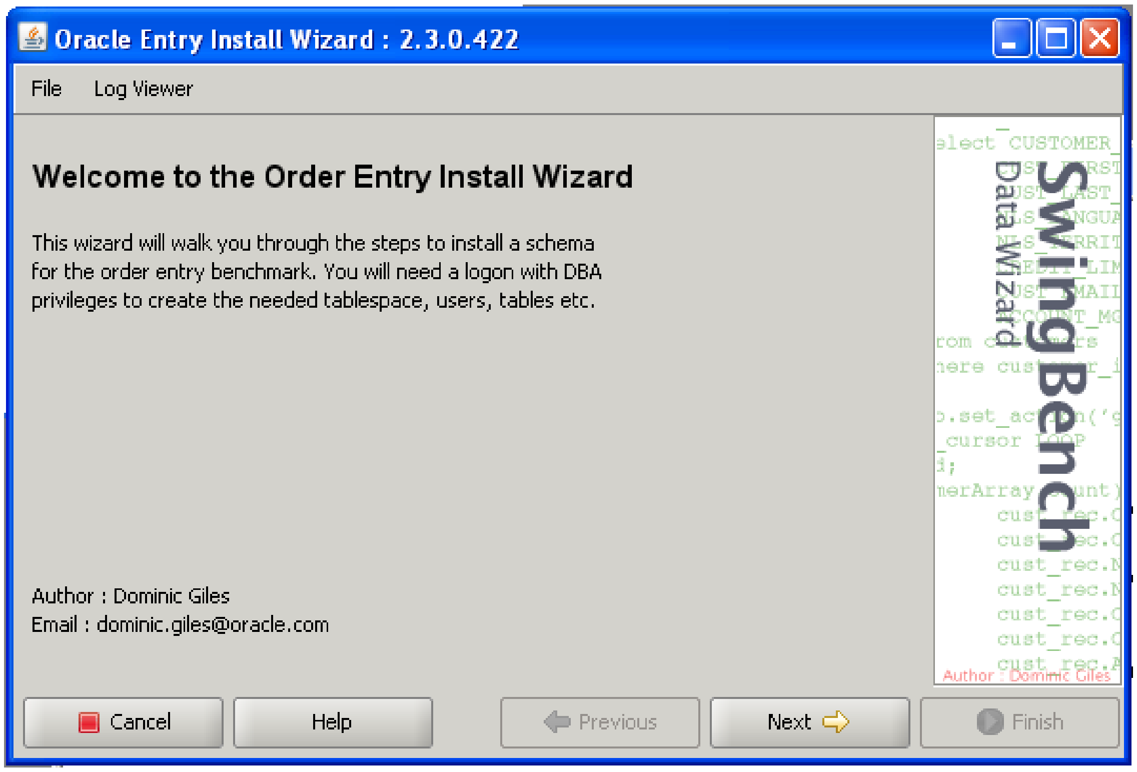
Oracle Benchmark Test (Swingbench)

The following screen-shots illustrate how swingbench works.



```
C:\>cd swingbench\winbin

C:\swingbench\winbin>oewizard.bat
```

Figure 1 – Enter swingbench directory and open oewizard

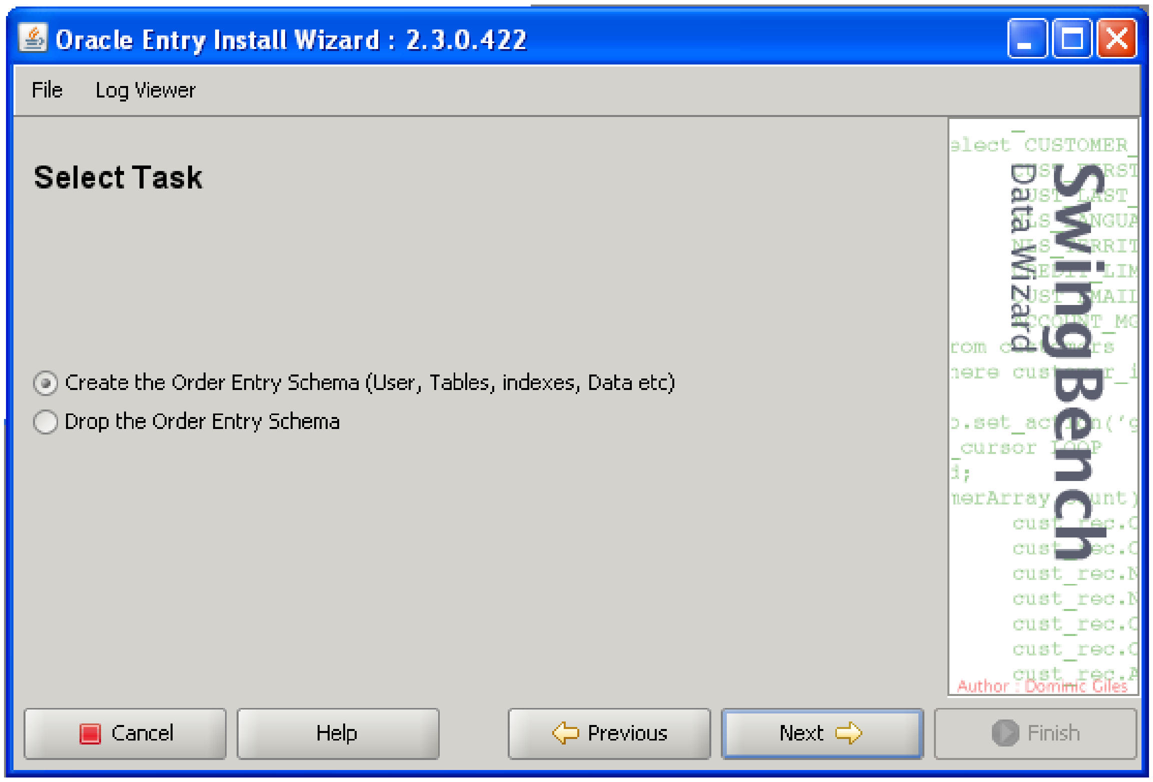


Welcome to the Order Entry Install Wizard

This wizard will walk you through the steps to install a schema for the order entry benchmark. You will need a logon with DBA privileges to create the needed tablespace, users, tables etc.

Author : Dominic Giles
Email : dominic.giles@oracle.com

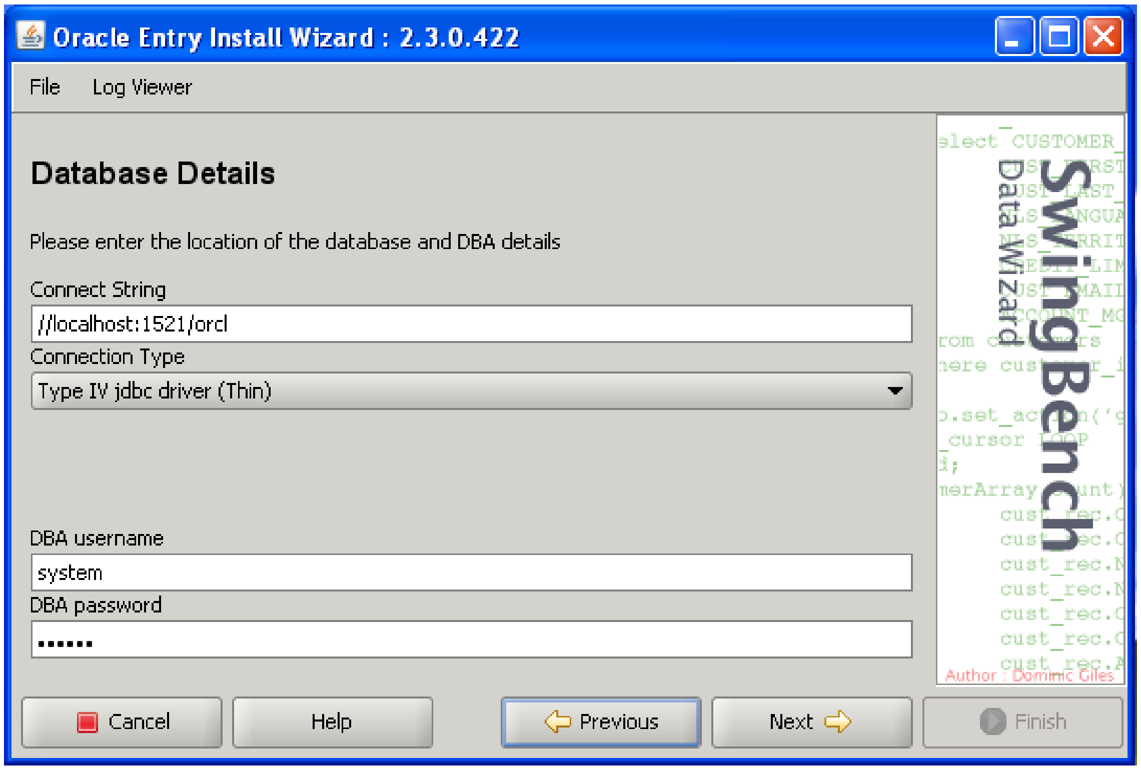
Figure 2 – oewizard, welcome screen



Select Task

[✓ Create the Order Entry Schema (User, Tables, indexes, Data etc)]
Drop the Order Entry Schema

Figure 3 – Oewizard, task selection


Oracle Entry Install Wizard : 2.3.0.422

File Log Viewer

Database Details

Please enter the location of the database and DBA details

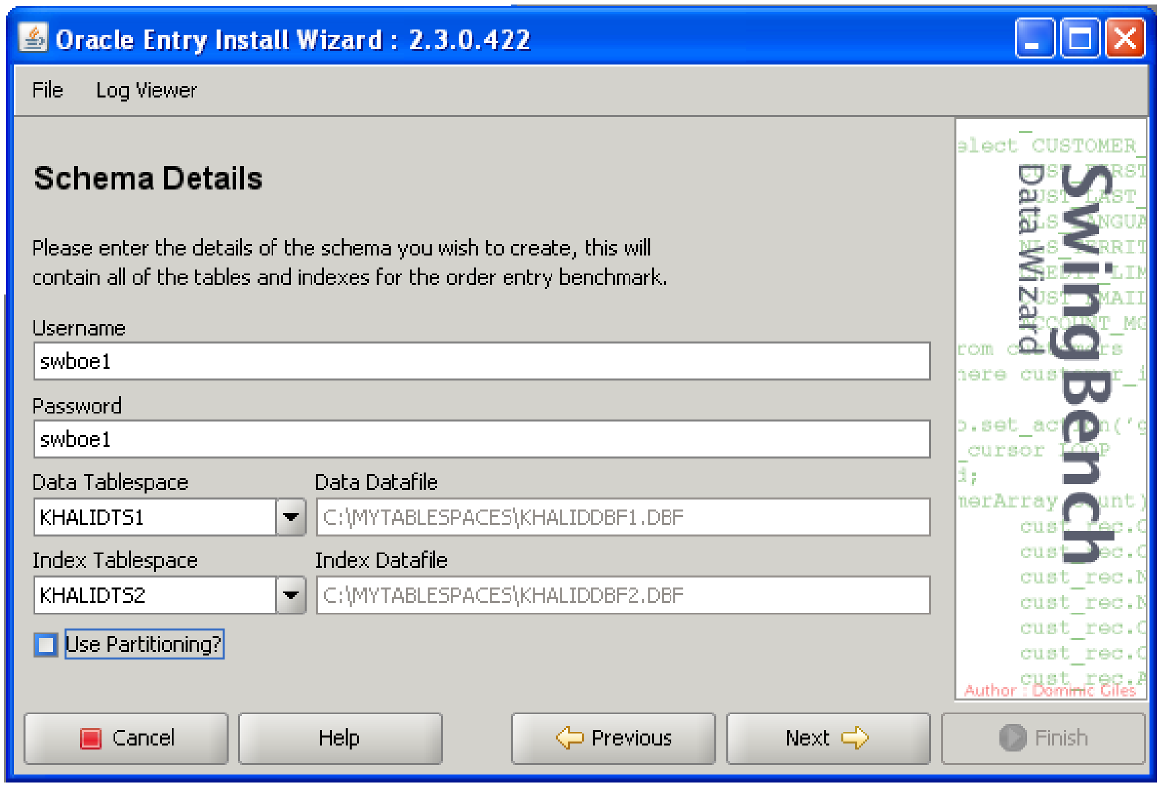
Connect String: //localhost:1521/orcl

Connection Type: Type IV jdbc driver (Thin)

DBA username: system

DBA password: ••••••

Figure 4 – Oewizard, DBA details


Oracle Entry Install Wizard : 2.3.0.422

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: swboe1

Password: swboe1

Data Tablespace: KHALIDTS1

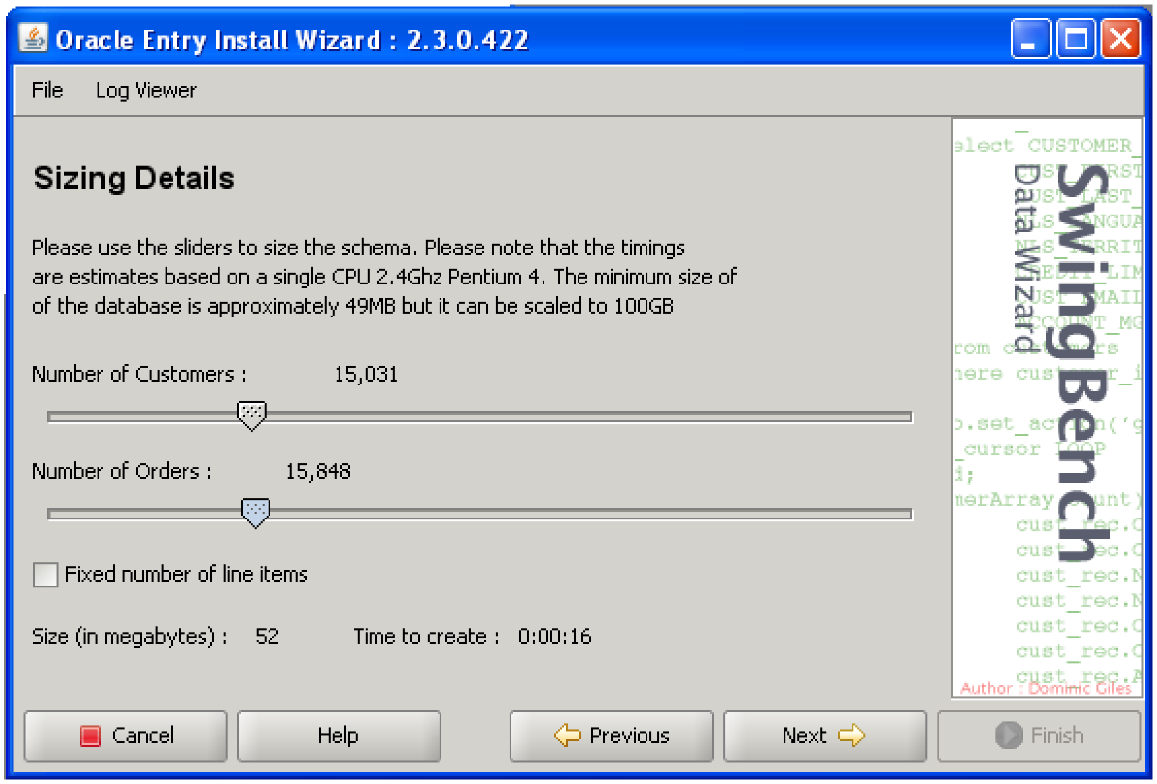
Data Datafile: C:\MYTABLESPACES\KHALIDDBF1.DBF

Index Tablespace: KHALIDTS2

Index Datafile: C:\MYTABLESPACES\KHALIDDBF2.DBF

Use Partitioning? ☐

Figure 5 – Oewizard, details of schema to be created



Sizing Details

Please use the sliders to size the schema. Please note that the timings are estimates based on a single CPU 2.4Ghz Pentium 4. The minimum size of of the database is approximately 49MB but it can be scaled to 100GB

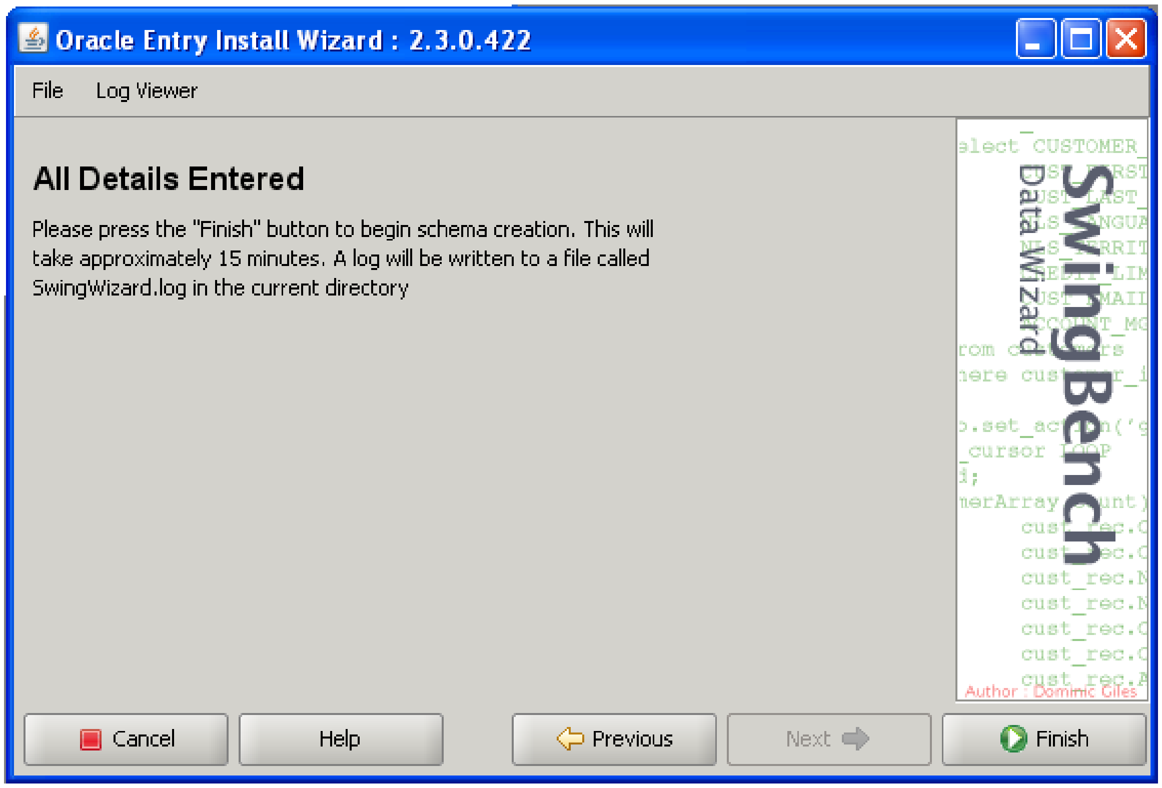
Number of Customers : 15,031

Number of Orders : 15,848

☐ Fixed number of line items

Size (in megabytes) : 52 Time to create : 0:00:16

Figure 6 – Oewizard, sizing details



All Details Entered

Please press the "Finish" button to begin schema creation. This will take approximately 15 minutes. A log will be written to a file called SwingWizard.log in the current directory

Figure 7 – Oewizard, ready to create schema

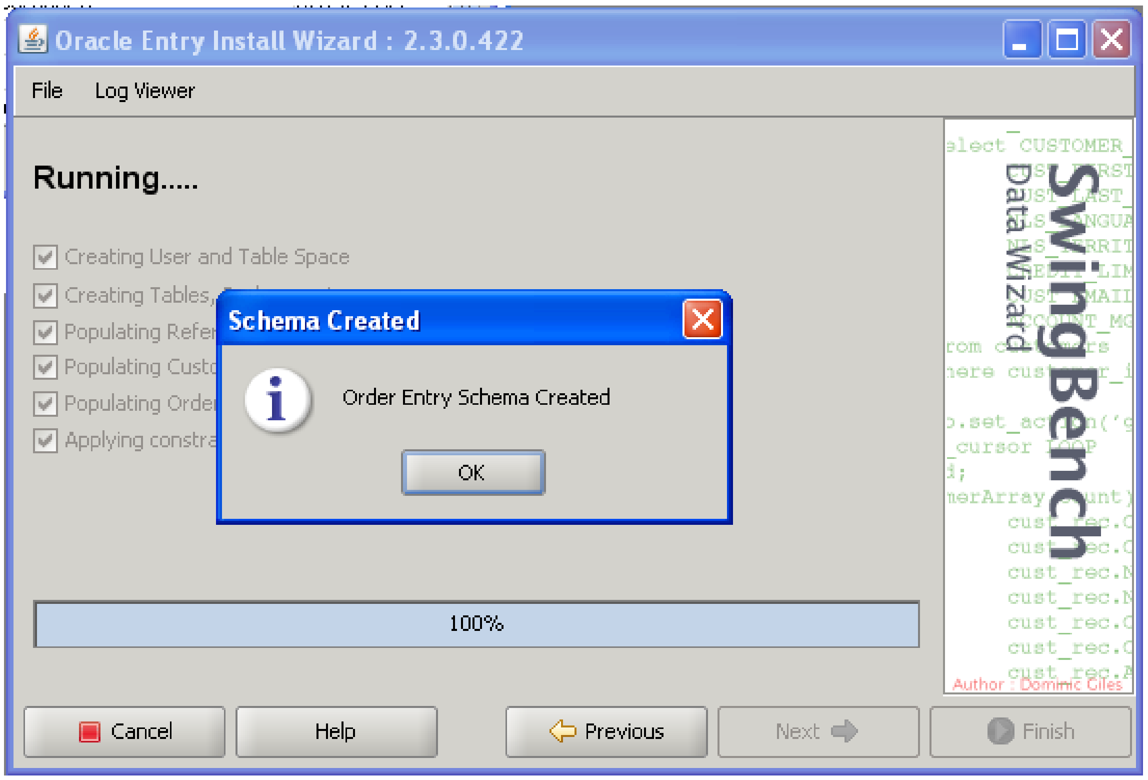


Figure 8 – Oewizard, oe schema created

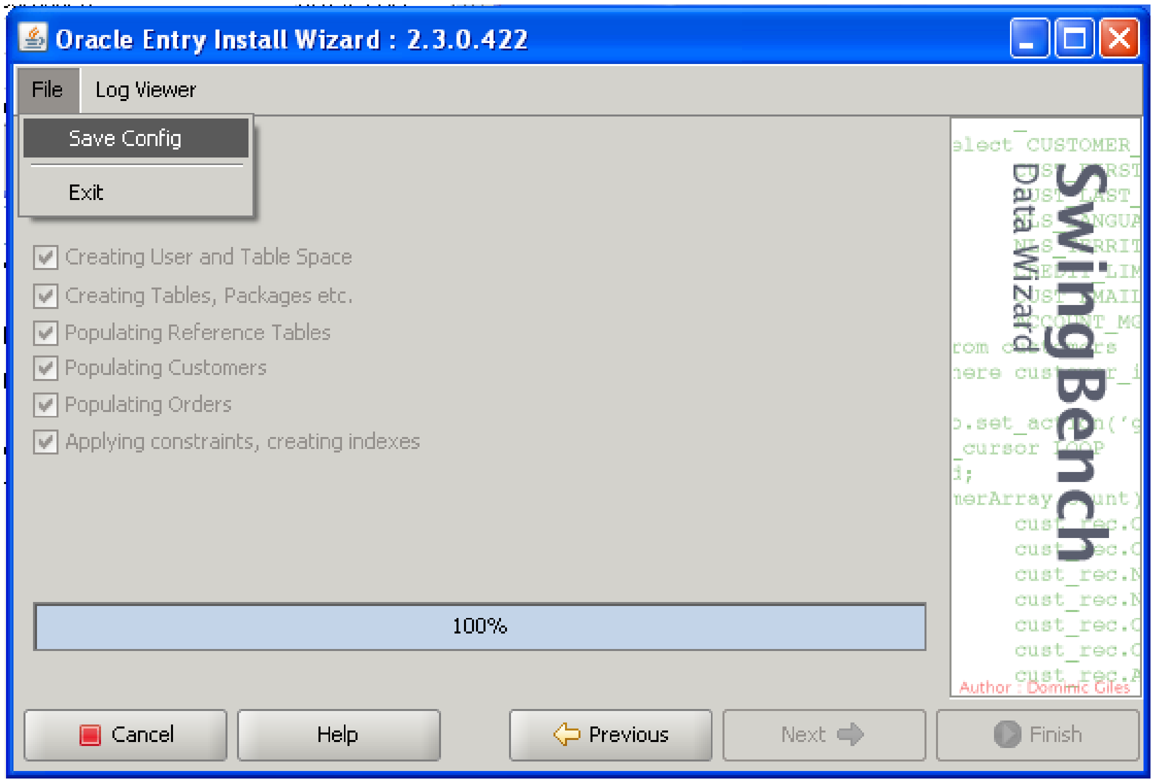

Oracle Entry Install Wizard : 2.3.0.422
File
Log Viewer
Save Config
Exit
Creating User and Table Space
Creating Tables, Packages etc.
Populating Reference Tables
Populating Customers
Populating Orders
Applying constraints, creating indexes
100%
SwingBench
Data Wizard
Author : Dominic Giles
Cancel
Help
Previous
Next
Finish

Figure 9 – Oewizard, oe schema created

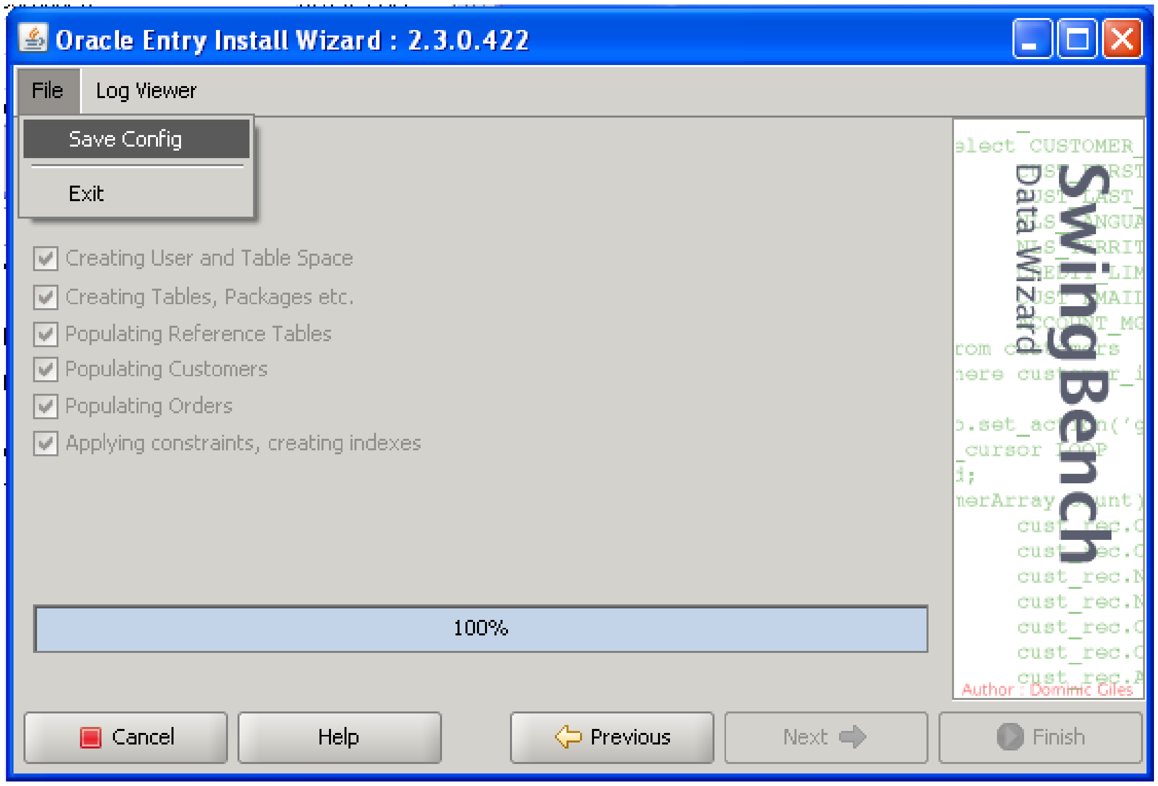
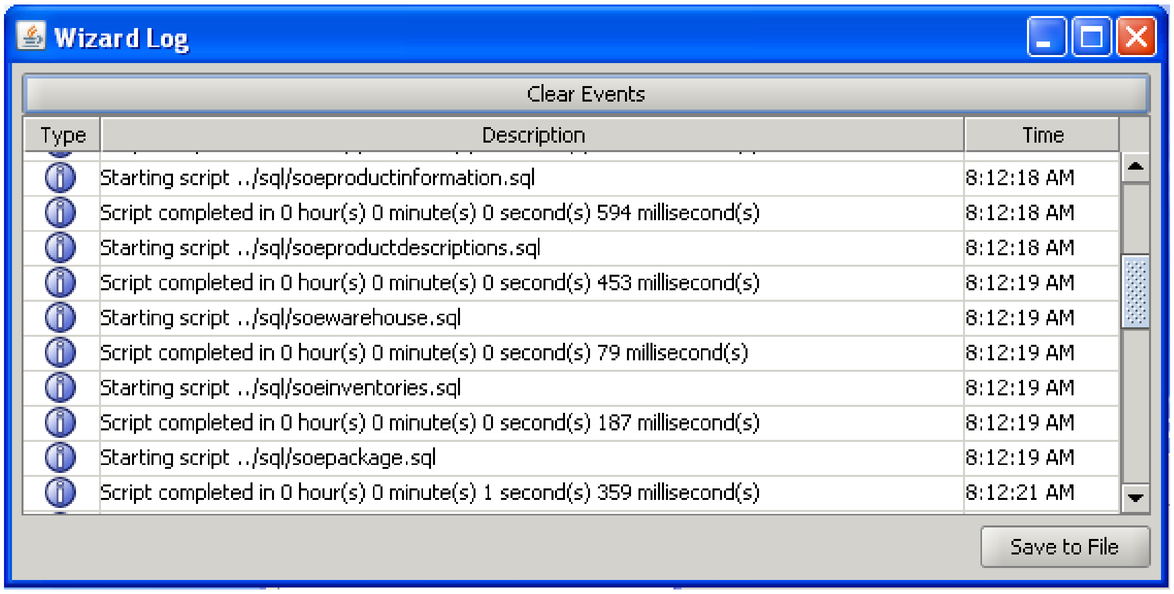

Oracle Entry Install Wizard : 2.3.0.422
File
Log Viewer
Save Config
Exit
Creating User and Table Space
Creating Tables, Packages etc.
Populating Reference Tables
Populating Customers
Populating Orders
Applying constraints, creating indexes
100%
SwingBench
Data Wizard
Author : Dominic Giles
Cancel
Help
Previous
Next
Finish

Figure 10 – Oewizard, saving configuration



Type	Description	Time
ⓘ	Starting script ../sql/soeproductinformation.sql	8:12:18 AM
ⓘ	Script completed in 0 hour(s) 0 minute(s) 0 second(s) 594 millisecond(s)	8:12:18 AM
ⓘ	Starting script ../sql/soeproductdescriptions.sql	8:12:18 AM
ⓘ	Script completed in 0 hour(s) 0 minute(s) 0 second(s) 453 millisecond(s)	8:12:19 AM
ⓘ	Starting script ../sql/soewarehouse.sql	8:12:19 AM
ⓘ	Script completed in 0 hour(s) 0 minute(s) 0 second(s) 79 millisecond(s)	8:12:19 AM
ⓘ	Starting script ../sql/soeinventories.sql	8:12:19 AM
ⓘ	Script completed in 0 hour(s) 0 minute(s) 0 second(s) 187 millisecond(s)	8:12:19 AM
ⓘ	Starting script ../sql/soepackage.sql	8:12:19 AM
ⓘ	Script completed in 0 hour(s) 0 minute(s) 1 second(s) 359 millisecond(s)	8:12:21 AM

Figure 11 – Oewizard, events log

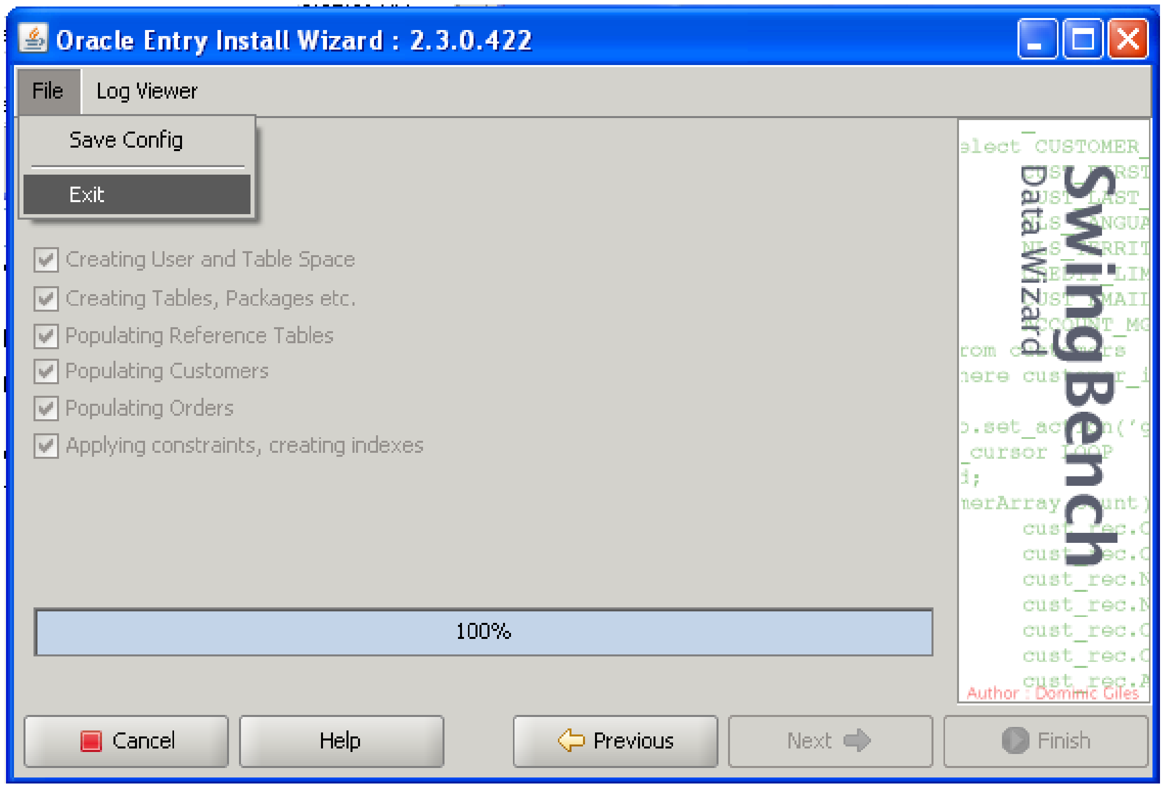
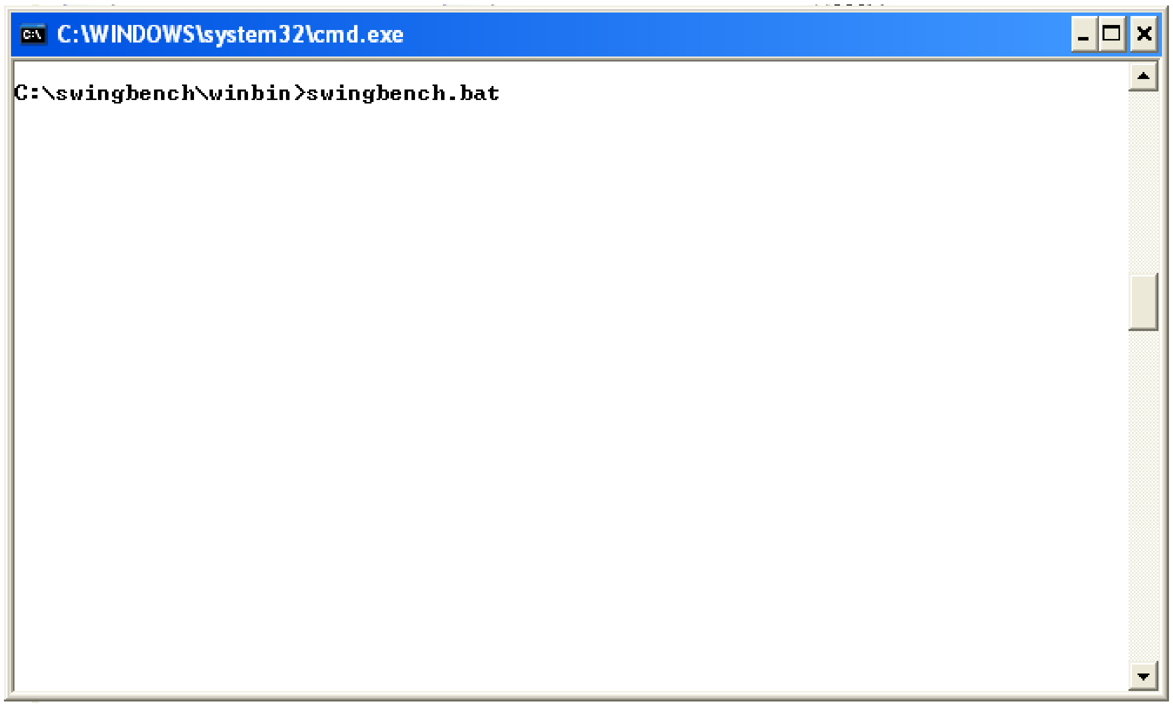
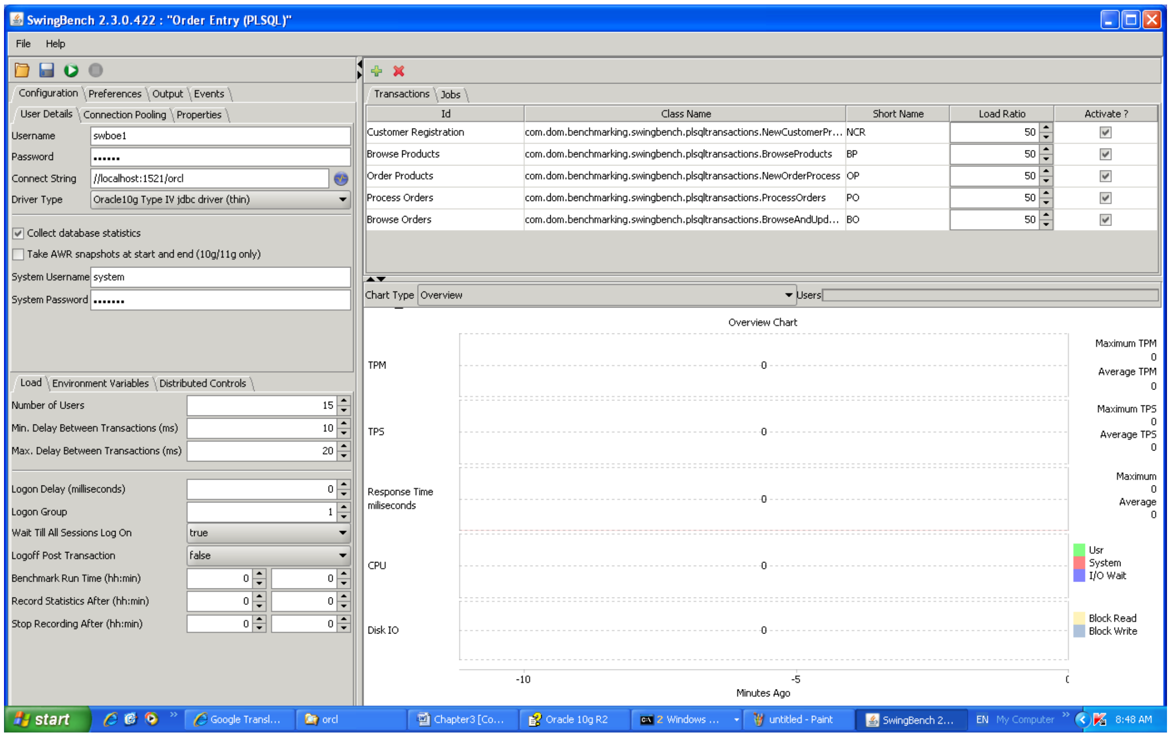

Oracle Entry Install Wizard : 2.3.0.422
File
Log Viewer
Save Config
Exit
Creating User and Table Space
Creating Tables, Packages etc.
Populating Reference Tables
Populating Customers
Populating Orders
Applying constraints, creating indexes
100%
SwingBench
Data Wizard
Author : Dominic Giles
Cancel
Help
Previous
Next
Finish

Figure 12 – Oewizard, exit



```
C:\swingbench\winbin>swingbench.bat
```

Figure 13 – Start swingbench


SwingBench 2.3.0.422 : "Order Entry (PLSQL)"

Username	swboe1
Password	••••••
Connect String	//localhost:1521/orcl
Driver Type	Oracle10g Type IV jdbc driver (thin)

[✓] Collect database statistics

[ ] Take AWR snapshots at start and end (10g/11g only)

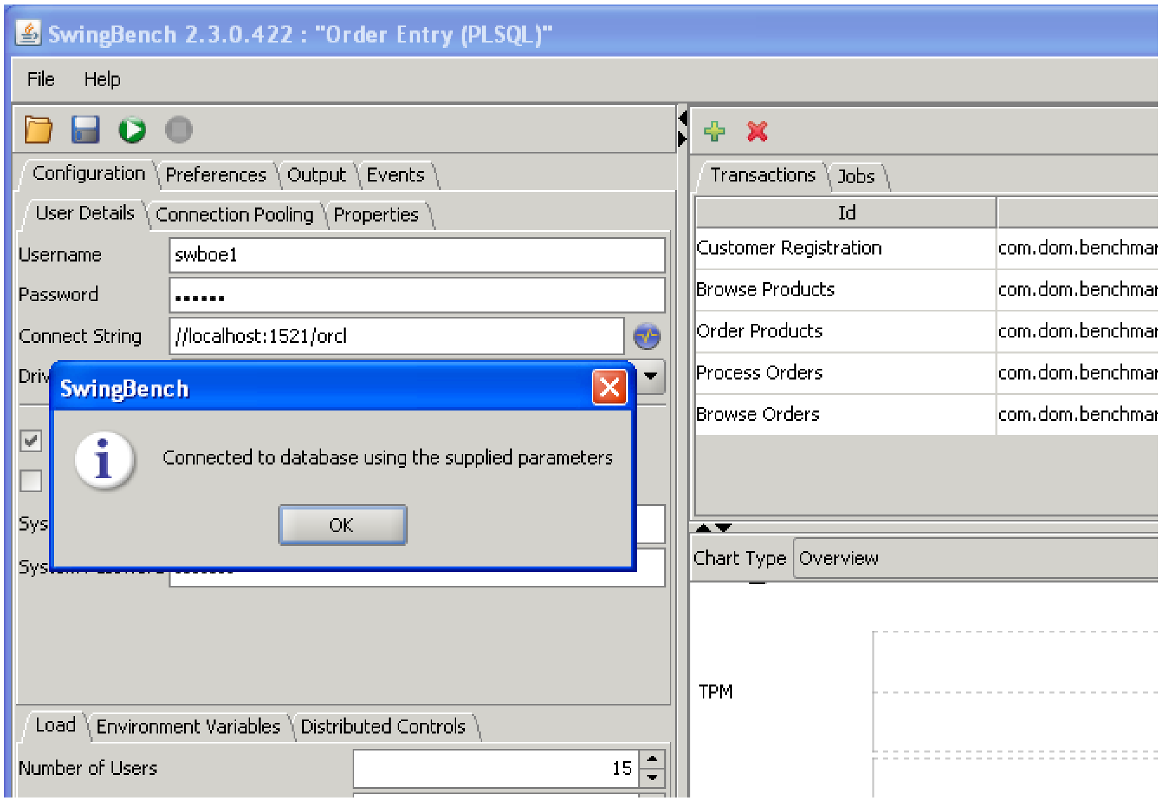
System Username	system
System Password	•••••••

Number of Users	15	
Min. Delay Between Transactions (ms)	10	
Max. Delay Between Transactions (ms)	20	
Logon Delay (milliseconds)	0	
Logon Group	1	
Wait Till All Sessions Log On	true	
Logoff Post Transaction	false	
Benchmark Run Time (hh:min)	0	0
Record Statistics After (hh:min)	0	0
Stop Recording After (hh:min)	0	0

Id	Class Name	Short Name	Load Ratio	Activate ?
Customer Registration	com.dom.benchmarking.swingbench.plsqltransactions.NewCustomerPr...	NCR	50	✓
Browse Products	com.dom.benchmarking.swingbench.plsqltransactions.BrowseProducts	BP	50	✓
Order Products	com.dom.benchmarking.swingbench.plsqltransactions.NewOrderProcess	OP	50	✓
Process Orders	com.dom.benchmarking.swingbench.plsqltransactions.ProcessOrders	PO	50	✓
Browse Orders	com.dom.benchmarking.swingbench.plsqltransactions.BrowseAndUpd...	BO	50	✓

Chart Type Overview

Figure 14 – Swingbench, main menu


SwingBench 2.3.0.422 : "Order Entry (PLSQL)"

Username	swboe1
Password	••••••
Connect String	//localhost:1521/orcl
Number of Users	15

SwingBench

Connected to database using the supplied parameters

Figure 15 – Swingbench, testing the connection to database