

UNIX 环境

Oracle/DB2 C 编程笔记

陈龙

目录

一、 环境准备	- 1 -
(一) 安装 RHEL 5.2.....	- 1 -
(二) 添加硬盘	- 1 -
(三) 安装开发环境	- 1 -
(四) 安装 JDK	- 1 -
(五) 安装 ORACLE 10g.....	- 1 -
(六) 安装后配置	- 18 -
(七) 开启企业管理器 (ORACLE ENTERPRISE MANAGER CONSOLE)	- 18 -
(八) 开启监听器	- 18 -
(九) 配置客户端连接	- 19 -
(十) 安装并配置 UNIXODBC.....	- 21 -
(十一) UNIXODBC C 程序代码操作 ORACLE 示例.....	- 25 -
(十二) ORACLE PRO*C 简单示例	- 26 -
(十三) 客户端 ORACLE UNIXODBC 连接配置	- 27 -
(十四) 中文配置	- 30 -
(十五) 安装 DB2 EXPRESS-C.....	- 31 -
(十六) DB2 创建 SAMPLE 数据库.....	- 41 -
(十七) ODBC C 程序代码操作 DB2 示例.....	- 41 -
(十八) DB2 EMBEDDED SQL 代码示例	- 45 -
(十九) 客户端远程连接 DB2 EXPRESS-C.....	- 46 -

一、环境准备

环境为 Vmware Workstaion 6.5.4、RHEL 5.2、Oracle 10g。

(一) 安装 RHEL 5.2

略。

(二) 添加硬盘

虚拟机添加硬盘后，root 权限登录 RHEL 5.2

```
# fdisk /dev/sdb
# mkfs.ext3 /dev/sdb1
# mkdir /oracle
# mount /dev/sdb1 /oracle
```

如果以上没有问题，则编辑/etc/fstabl 在最后添加

```
/dev/sdb1 /oracle ext3 defaults 1 1
```

(三) 安装开发环境

在/etc/yum.repo.d 中新建文件 my.repo，内容如下

```
[my]
name=my
baseurl=file:///mnt/cdrom0/Server
enabled=1
gpgcheck=0
```

挂载 cdrom 到/mnt/cdrom0，然后运行

```
# yum makecache
# yum -y groupinstall "Development Tools" "Development Libraries"
```

(四) 安装 JDK

虽然安装 Oracle 10g 不必安装 JDK，但是为了方便以后开发，还是在此将 JDK 一道安装上去。将下载的 JDK，例如 jdk-6u21-linux-i586.bin，拷贝至 root 下，然后执行

```
# cp ~/jdk-6u21-linux-i586.bin /opt
# cd /opt
# chmod +x jdk-6u21-linux-i586.bin
# ./jdk-6u21-linux-i586.bin
```

然后配置/etc/profile

```
# vi /etc/profile 添加如下内容
export JAVA_HOME=/opt/jdk1.6.0_21
export PATH=$JAVA_HOME/bin:$PATH
export CLASSPATH=.:$JAVA_HOME/lib/dt.jar:$JAVA_HOME/lib/tools.jar
```

配置 Java 的中文字体，在 RHEL5.2 下执行

```
# ln -s /usr/share/fonts/chinese/TrueType /opt/jdk1.6.0_21/jre/lib/fonts/fallback
```

(五) 安装 Oracle 10g

1. 检查 Oracle 安装所依赖的包是否装全

```
setarch-2*
make-3*
glibc-2*
libaio-0*
compat-libstdc++-33-3*
compat-gcc-34-3*
compat-gcc-34-c++-3*
gcc-4*
libXp-1*
openmotif22-*
compat-db-4*
```

可以使用类似 `rpm -qa | grep setarch` 的命令来检查系统是否安装了该包，如果没有安装可以使用类似 `yum search setarch` 的命令来搜索光盘上是否有该包，如果有可以使用类似 `yum install setarch` 之类的命令安装之。

2. 配置主机名及网络设置

```
# vi /etc/sysconfig/network
```

```
HOSTNAME=oracle1.hrwang.com           #真对自己的情况改名吧
```

```
# vi /etc/sysconfig/network-scripts/ifcfg-eth0
```

```
DEVICE=eth0
BOOTPROTO=static
HWADDR=00:0C:29:8A:CF:56
ONBOOT=yes
IPADDR=192.168.56.10
NETMASK=255.255.255.0
GATEWAY=192.168.56.2
```

3. 添加 Oracle 所需的账户/组

```
# groupadd oinstall
# groupadd dba
# groupadd oper
# useradd -g oinstall -G dba oracle
# passwd oracle
# mkdir /oracle           #用于安装 oracle 用的
# chown -R oracle:oinstall /oracle
# chmod -R 775 /oracle
```

4. 修改内核参数

```
kernel.shmmni = 4096
kernel.sem = 250 32000 100 128
fs.file-max = 65536
net.ipv4.ip_local_port_range = 1024 65000
net.core.rmem_default=262144
net.core.rmem_max=262144
net.core.wmem_default=262144
net.core.wmem_max=262144
```

5. 修改/etc/redhat-release 文件

```
# su - oracle
$ vi ~/.bash_profile
-----
export ORACLE_BASE=/oracle
export ORACLE_HOME=$ORACLE_BASE/product/10.2.0/db_1
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib:/usr/local/lib
export ORACLE_SID=cldb
export NLS_LANG='SIMPLIFIED CHINESE' _CHINA.UTF8
# Get the aliases and functions
if [ -f ~/.bashrc ]; then
    . ~/.bashrc
fi
# User specific environment and startup programs
PATH=$PATH:$HOME/bin
export PATH
export PATH=$PATH:$ORACLE_HOME/bin
export LC_ALL=en_US.UTF-8
```

6. 修改/etc/redhat-release 文件

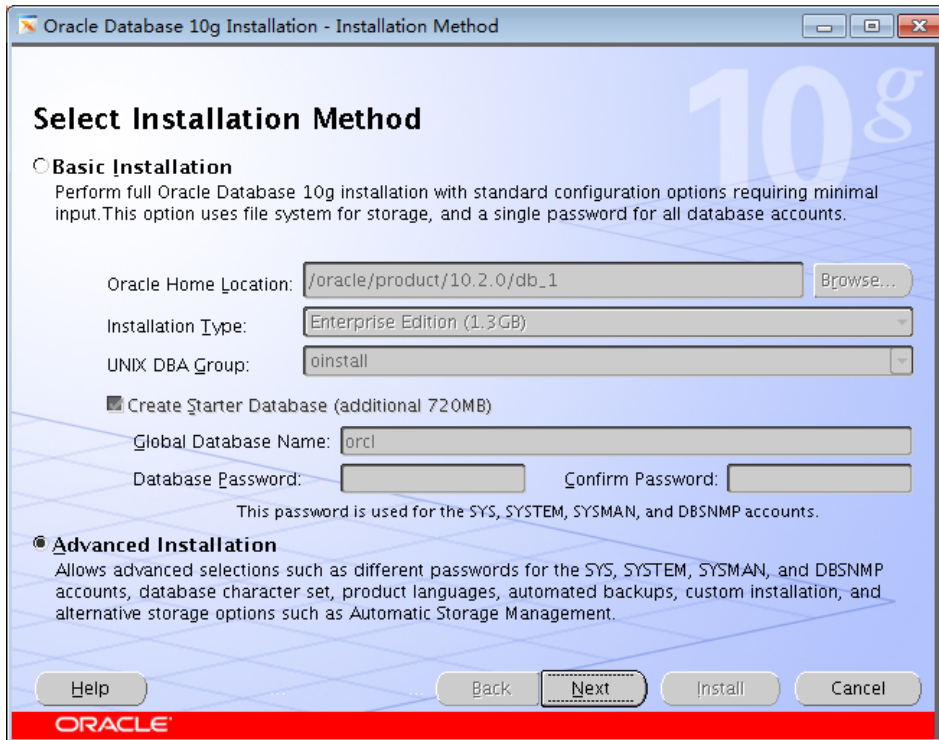
因为 Oracle 10g 官方只支持到 RHEL4 为止, 所以需要更改版本说明, 编辑/etc/redhat-release 文件, 删除 Red Hat Enterprise Linux Server release 5 (Tikanga), 改为 redhat-4。

7. 解压并安装 Oracle 10g

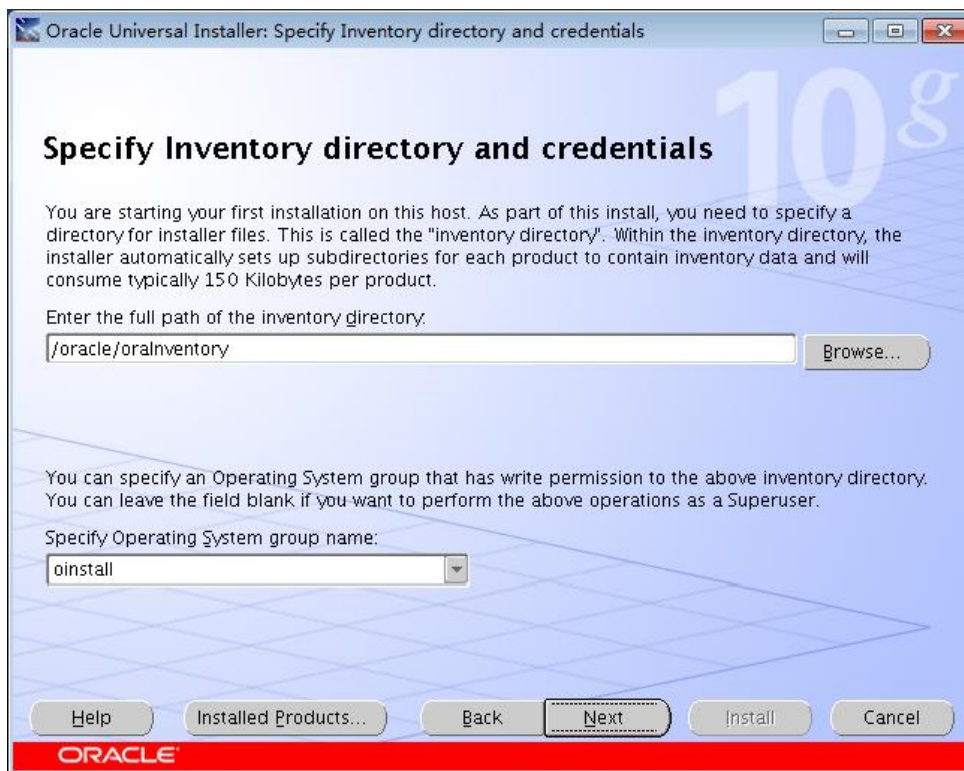
远程安装 Oracle, 启动 Xmanager - passive, 用 SecureCRT 通过 SSH 登录 oracle 用户登录, 并执行:
(在此需要注意应将运行 Xmanager 的 Windows 系统的防火墙关闭)

```
$ export DISPLAY=192.168.56.1:0.0
$ unzip 10201_database_linux32.zip
$ cd database
$ ./runInstaller
```

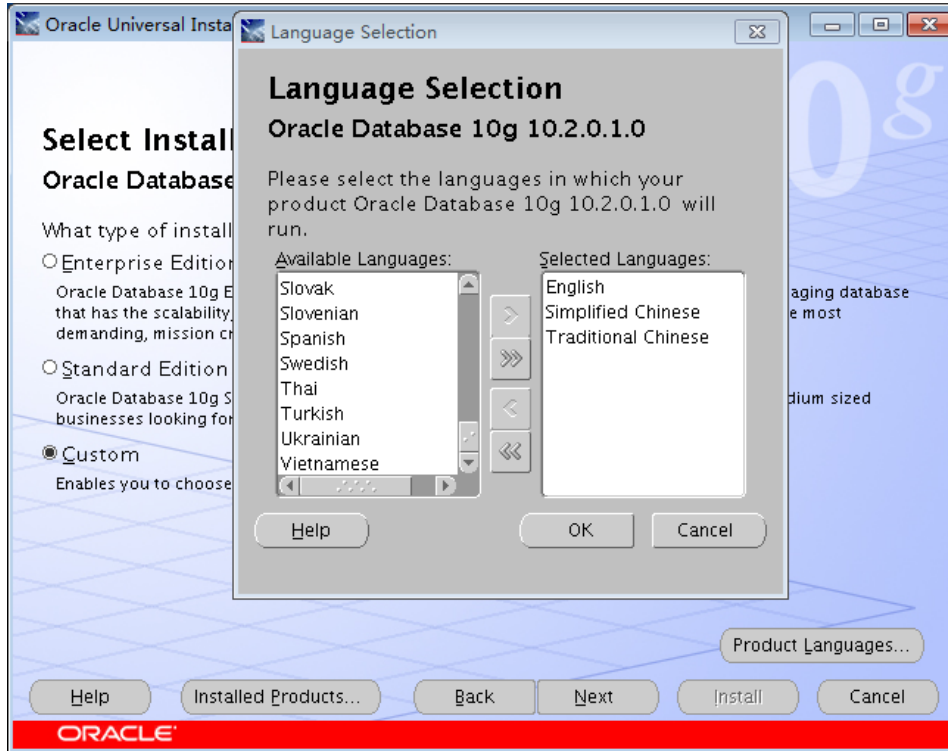
出现如下画面, 并选择如下图所示:



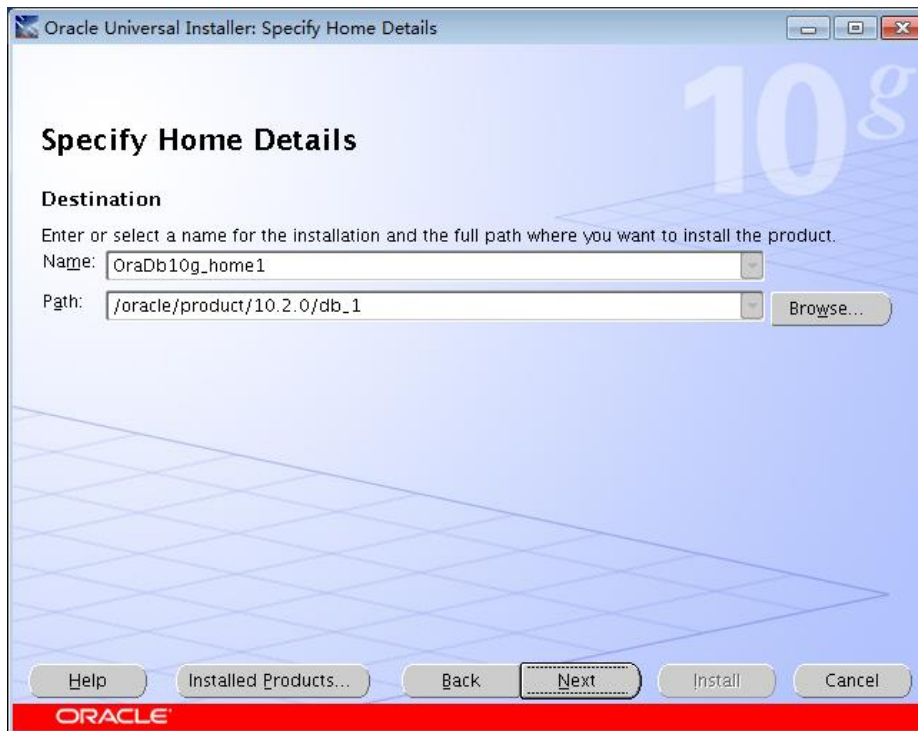
点 next 后，如下图：



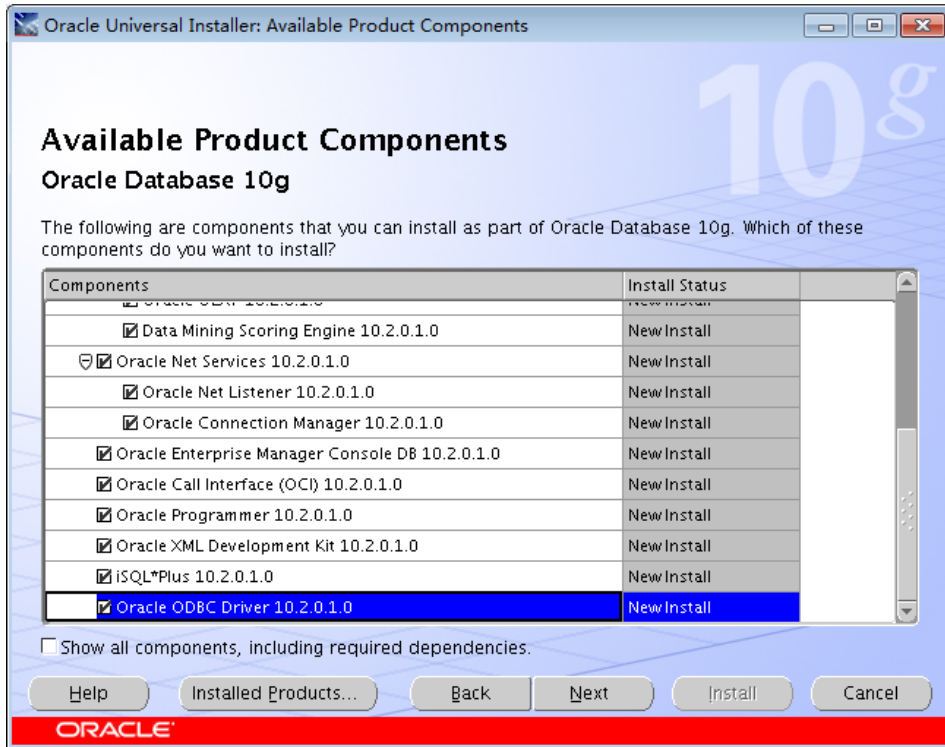
点 next 后，如下图，安装方式选择定制“Custom”，并选择 Oracle 运行支持的语言“Product Languages”：



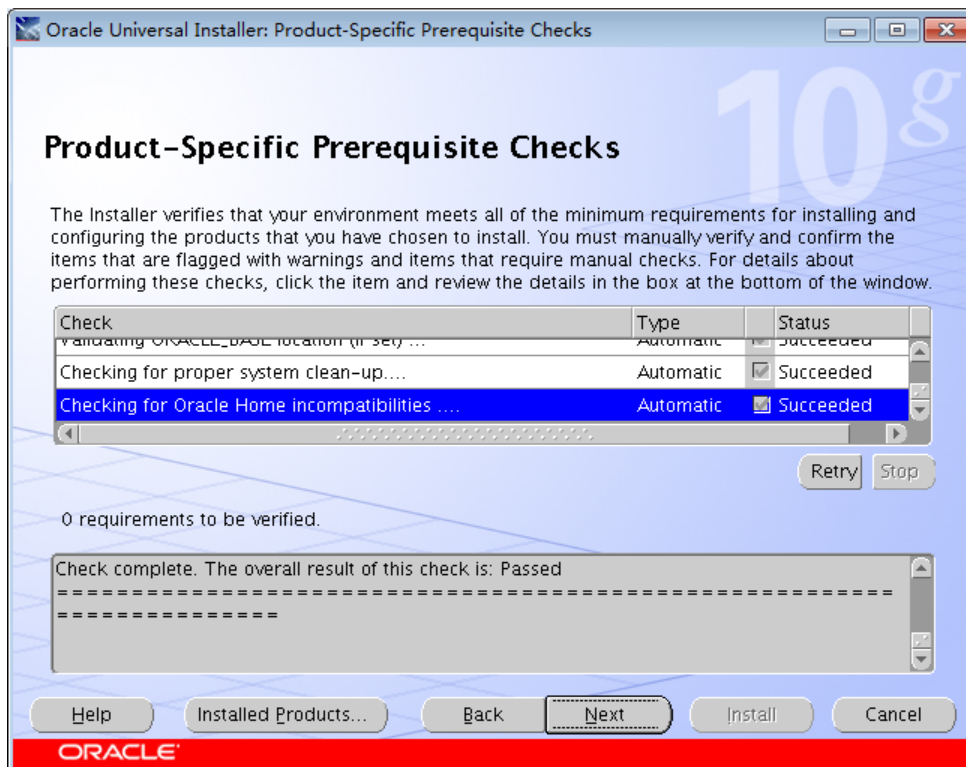
点 next 后，如下图：



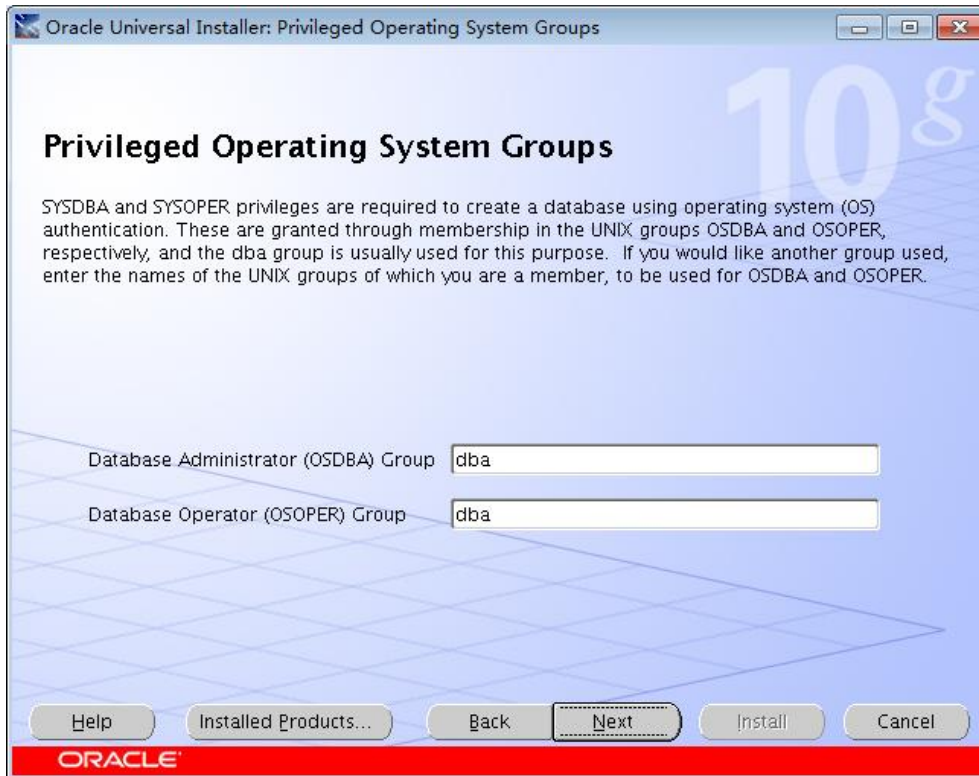
点 next 后，如下图，在此一定要将最后一项 ODBC 驱动（“Oracle ODBC Driver 10.2.0.1.0”）选中：



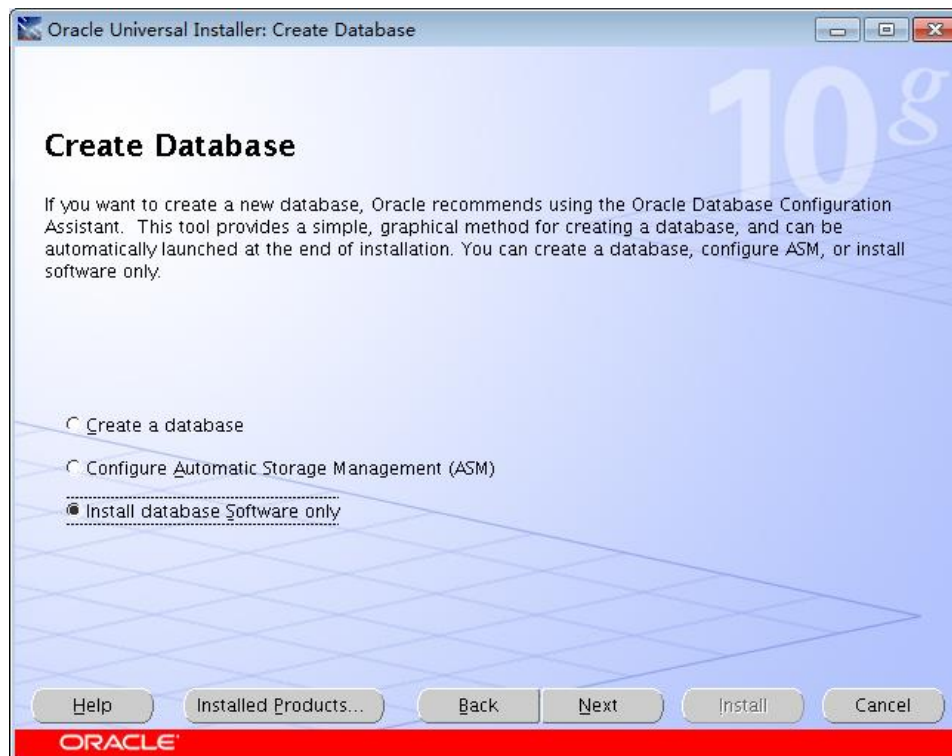
点 next 后，如下图：



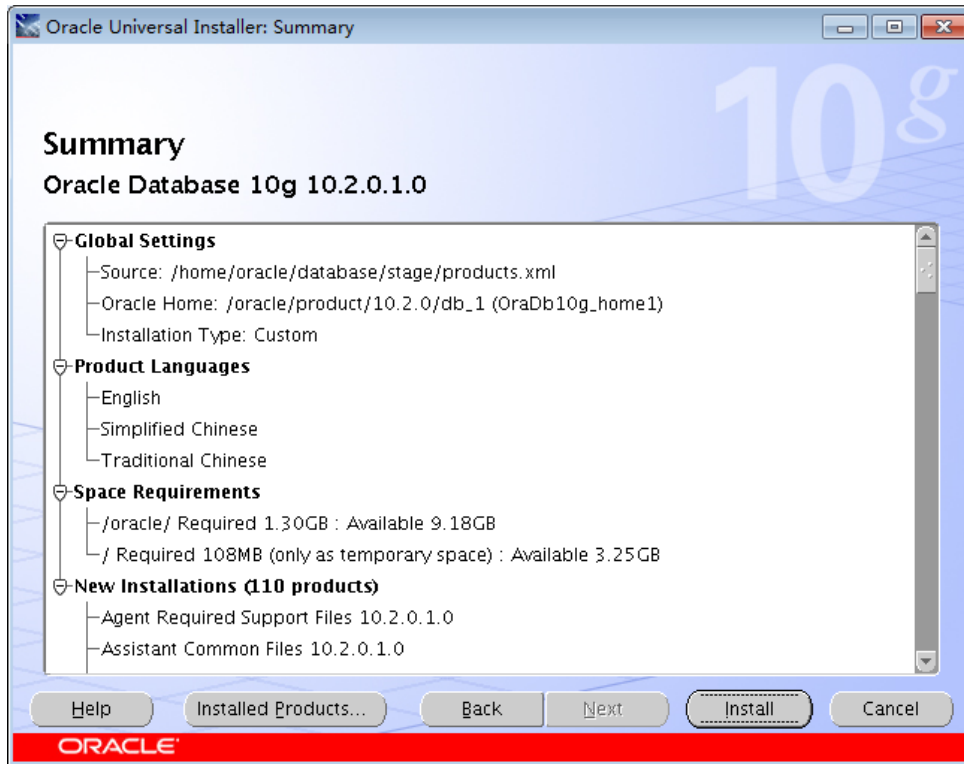
点 next 后，如下图：



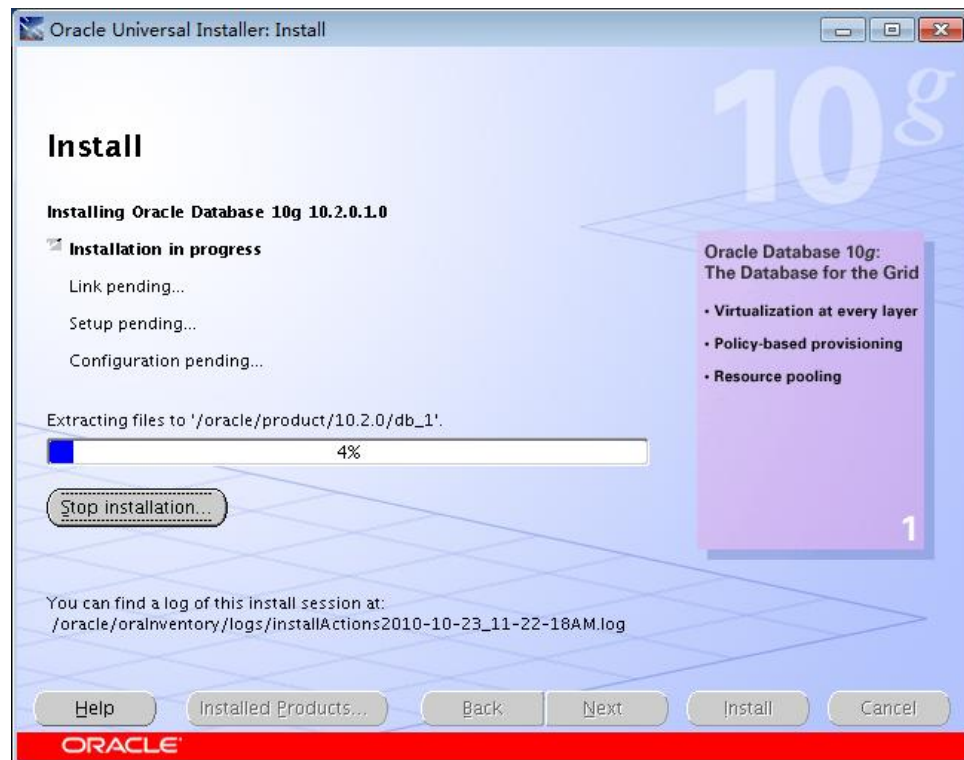
点 next 后，如下图：



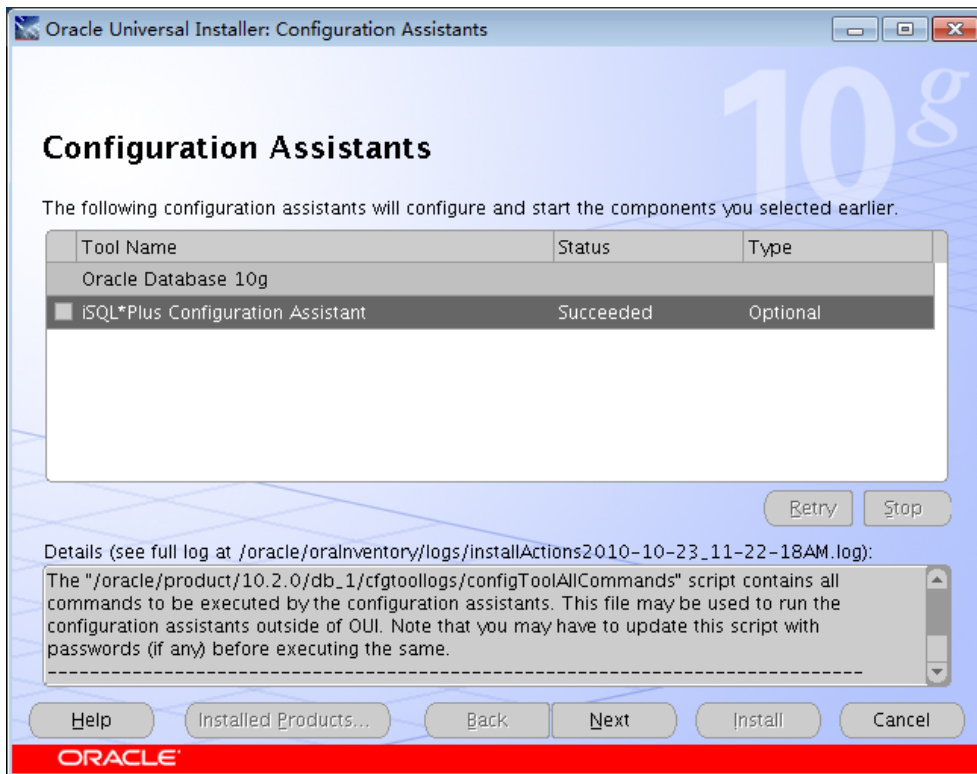
点 next 后，如下图：



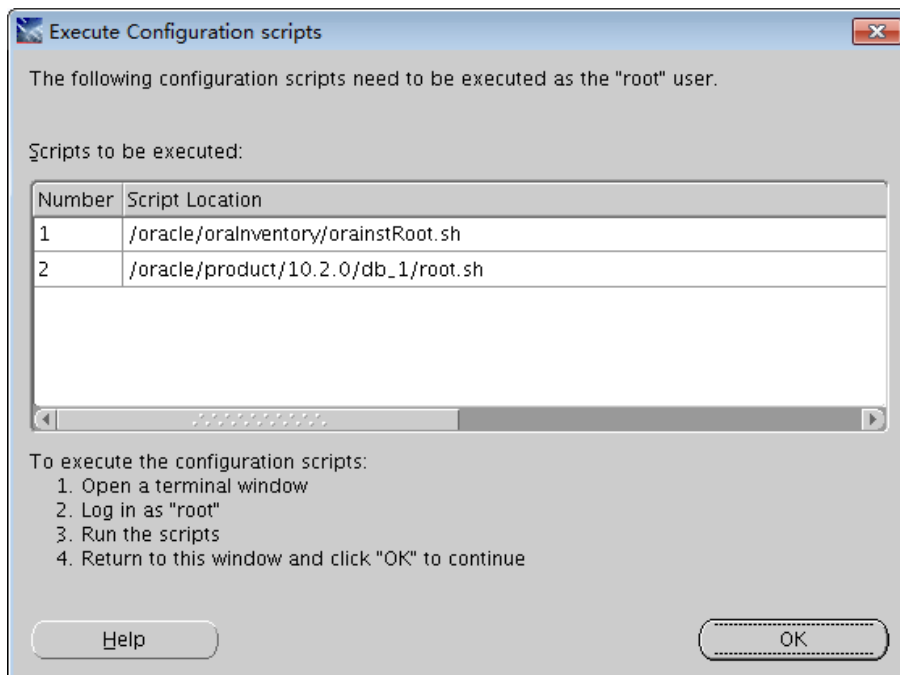
点 next 后，如下图：



点 next 后，如下图：



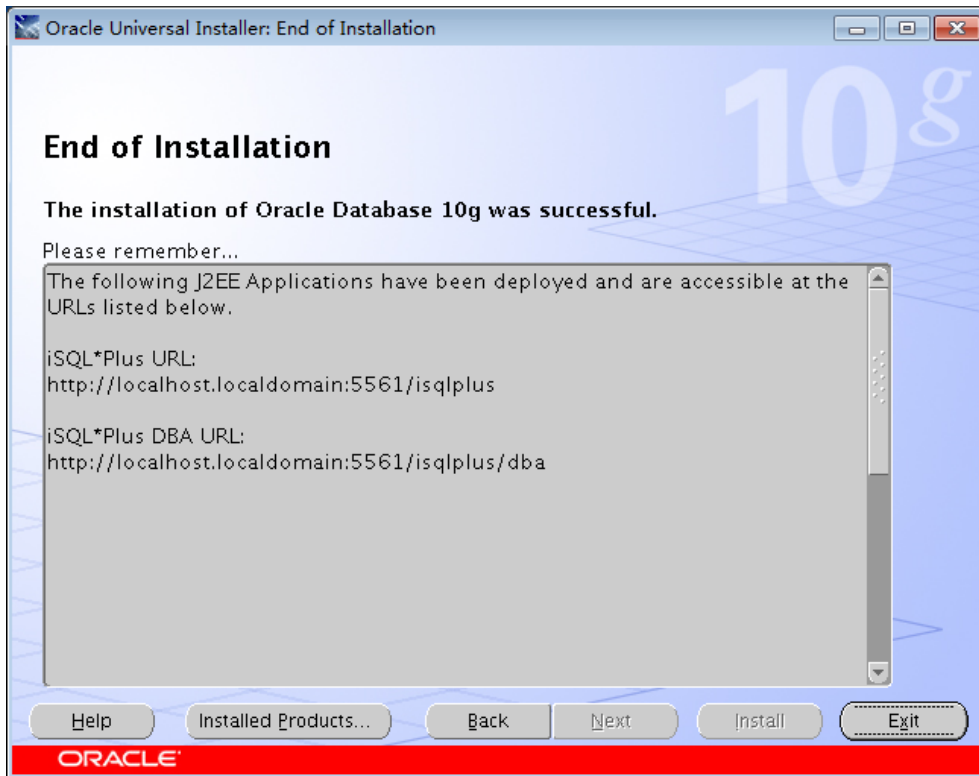
接下来将弹出如下对话框，提示使用 root 权限运行两个脚本：



以 root 用户登录，执行上图所示的两个脚本

```
# /oracle/oraInventory/orainstRoot.sh
# /oracle/product/10.2.0/db_1/root.sh
```

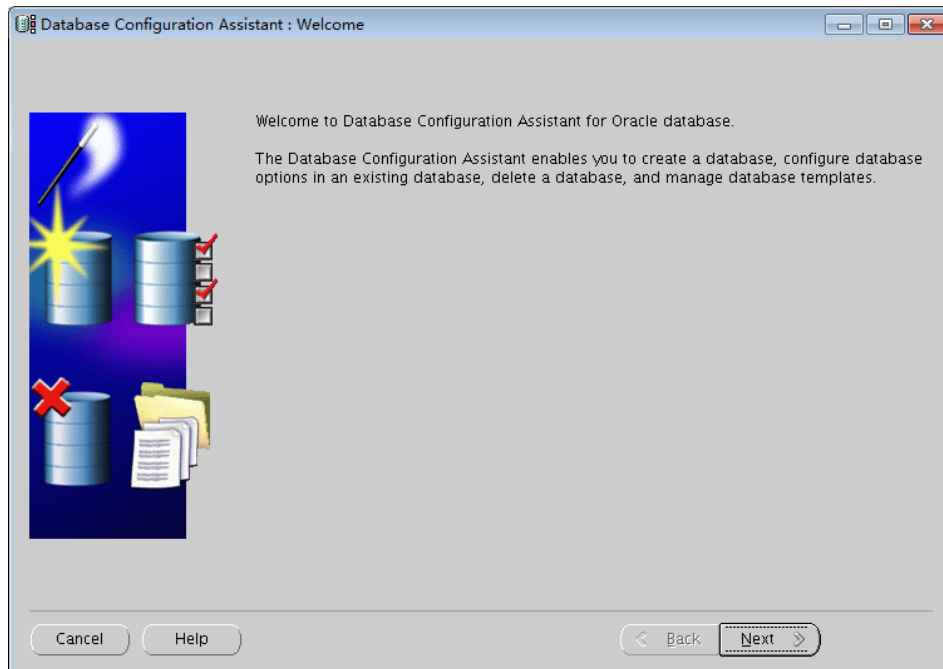
然后点上图的 OK 后，如下图

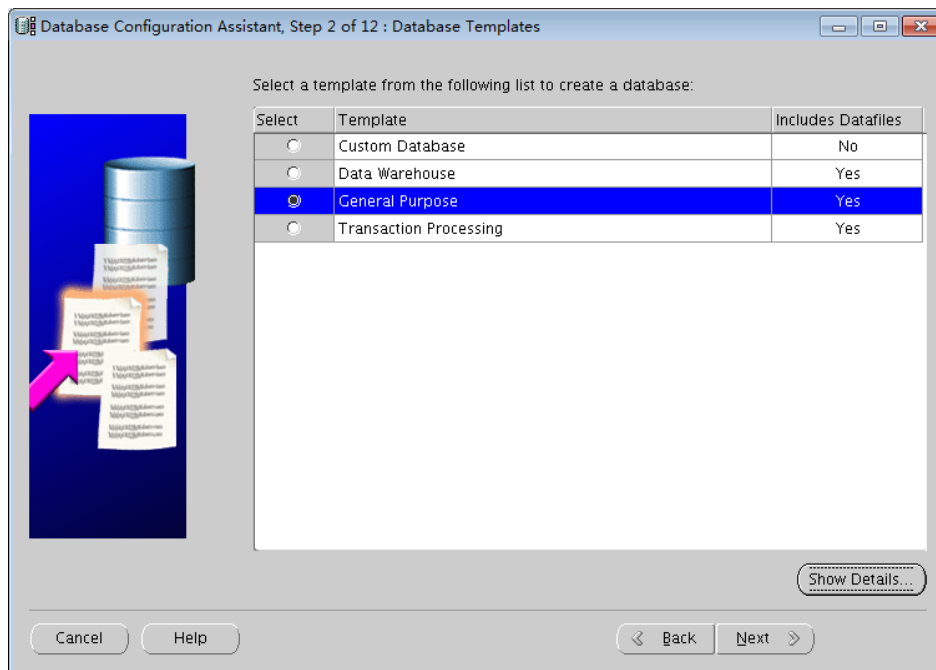
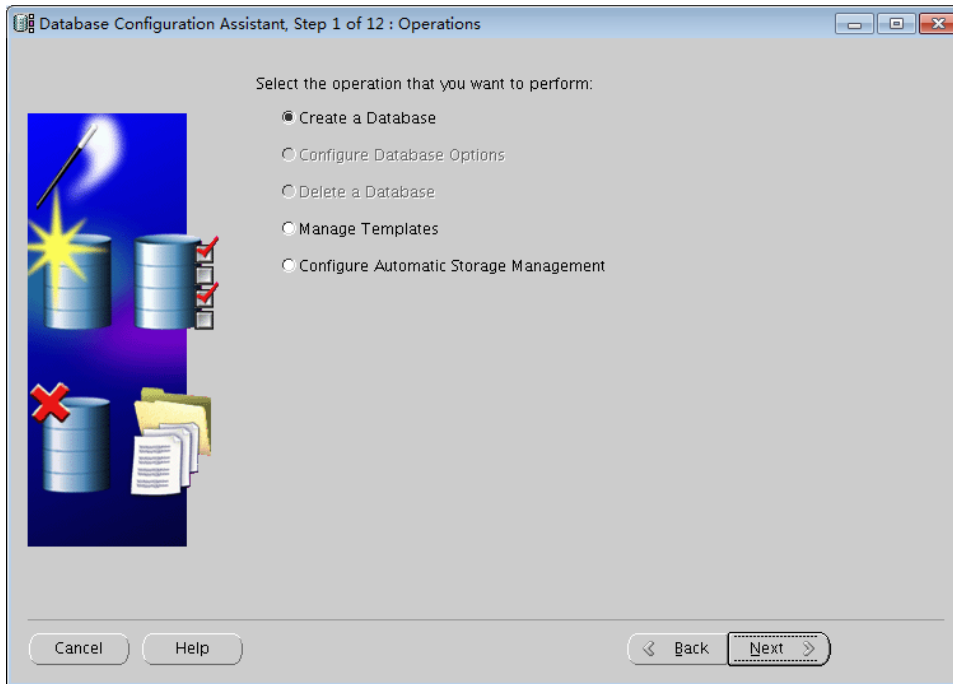


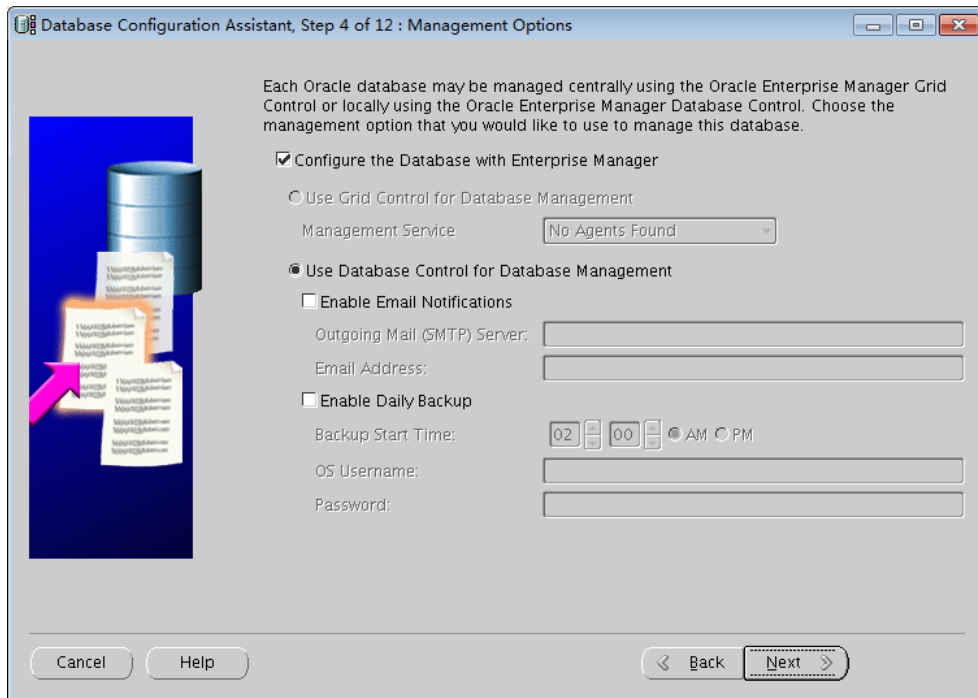
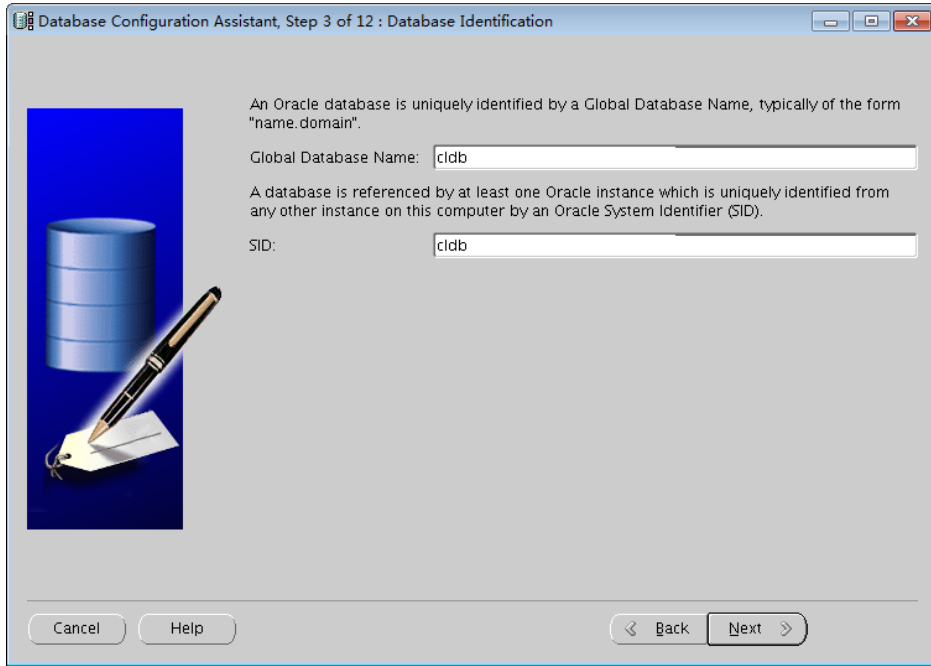
安装完毕。

8. 创建数据库

用 oracle 登录，运行 dbca，如下图：







在此处设置密码为：c1456

Database Configuration Assistant, Step 5 of 12 : Database Credentials

For security reasons, you must specify passwords for the following user accounts in the new database.

Use the Same Password for All Accounts

Password:

Confirm Password:

Use Different Passwords

User Name	Password	Confirm Password
SYS		
SYSTEM		
DBSNMP		
SYSMAN		

Cancel Help < Back Next >

Database Configuration Assistant, Step 6 of 12 : Storage Options

Select the storage mechanism you would like to use for the database.

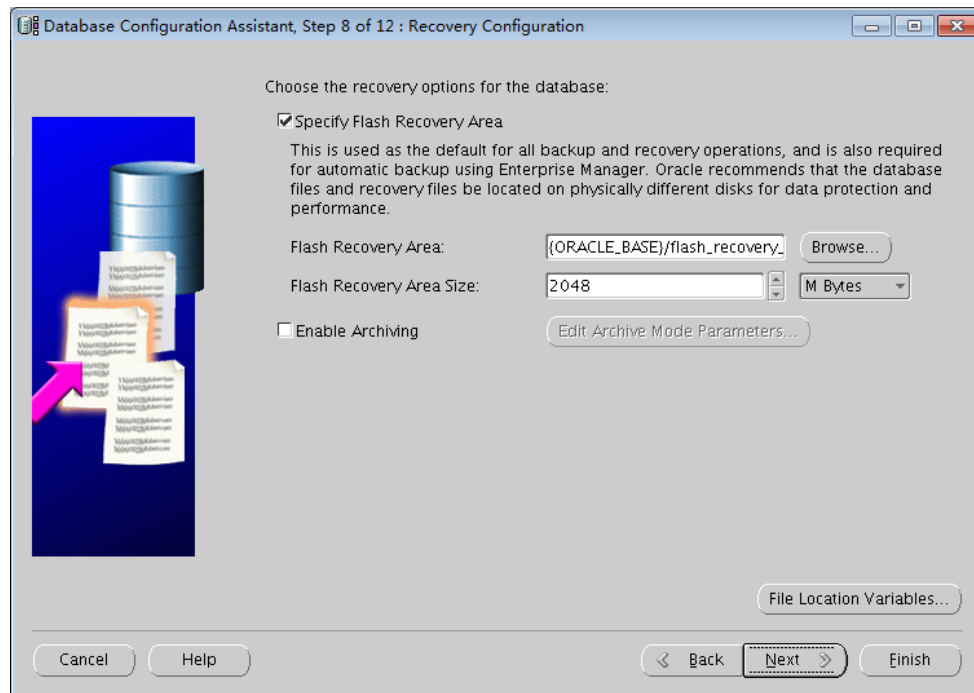
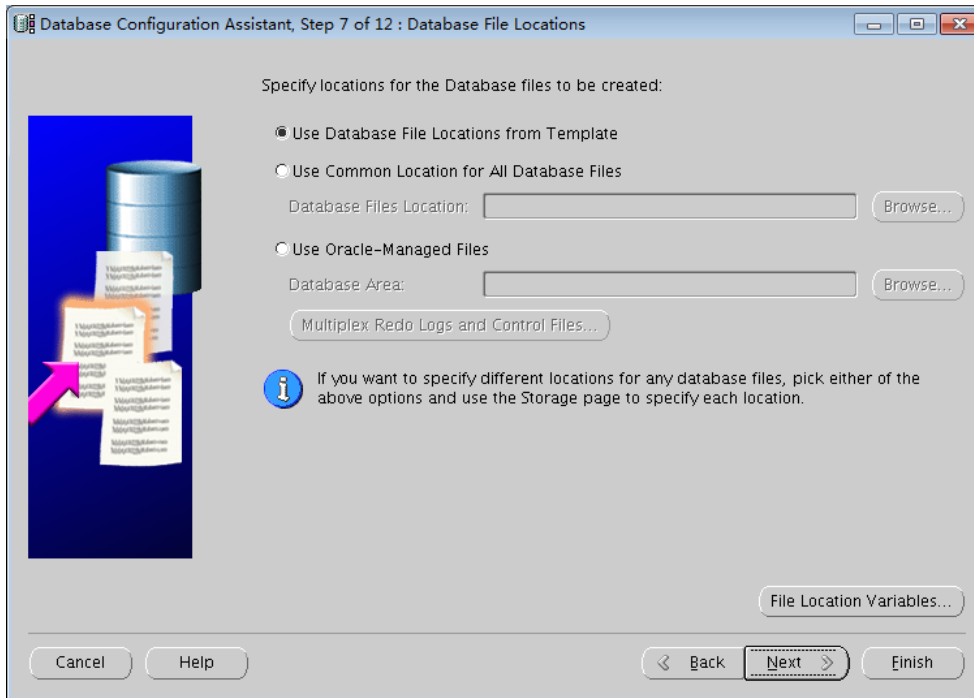
File System
Use the File System for Database storage.

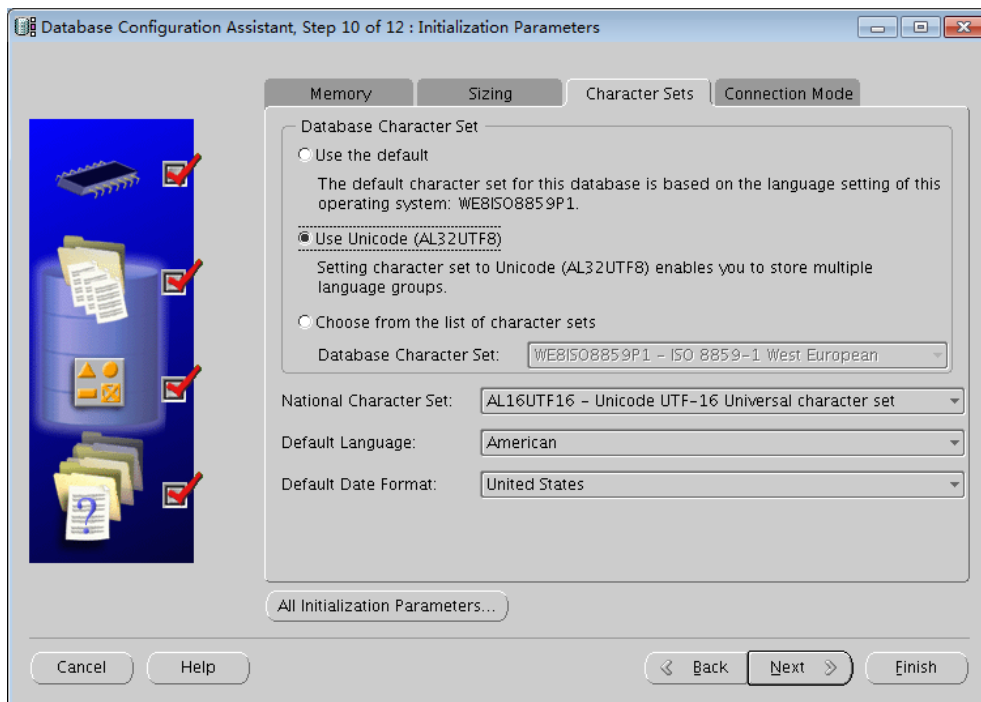
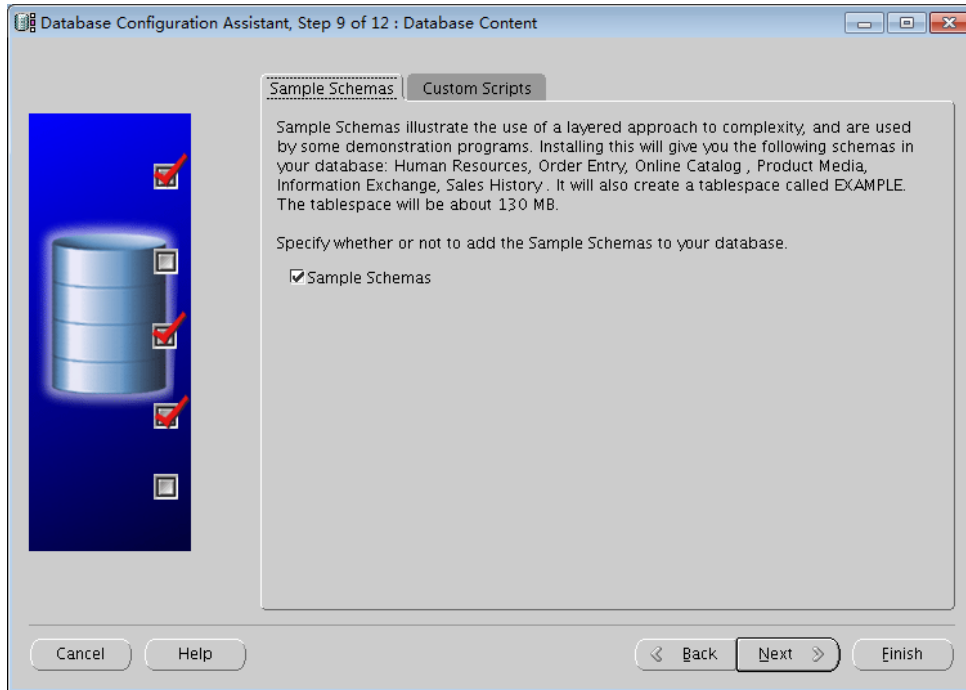
Automatic Storage Management (ASM)
Automatic Storage Management simplifies database storage administration and optimizes database layout for I/O performance. To use this option you must either specify a set of disks to create an ASM disk group or specify an existing ASM disk group.

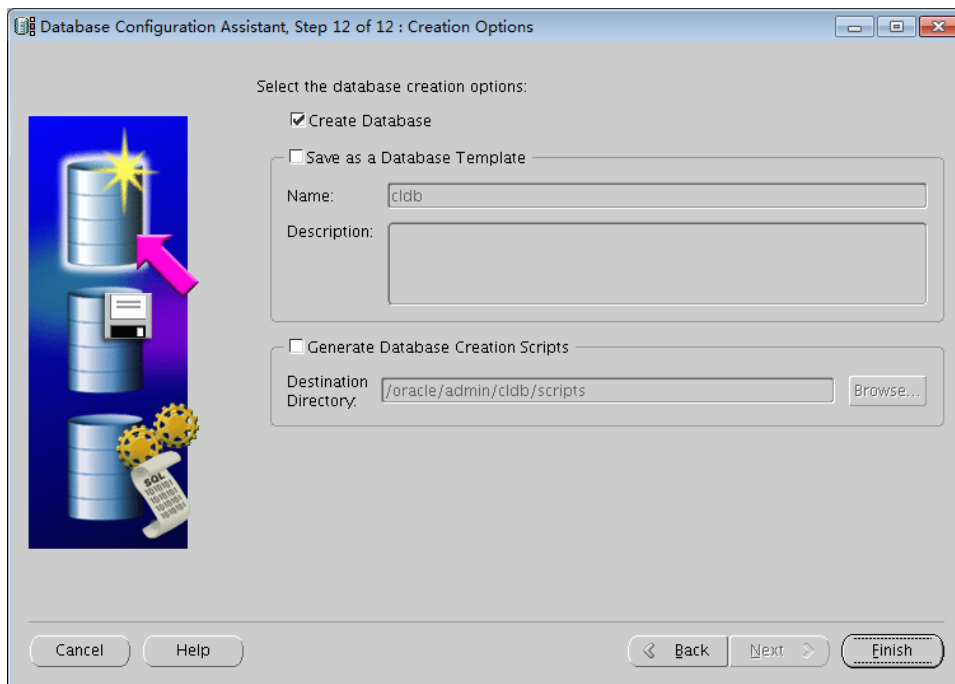
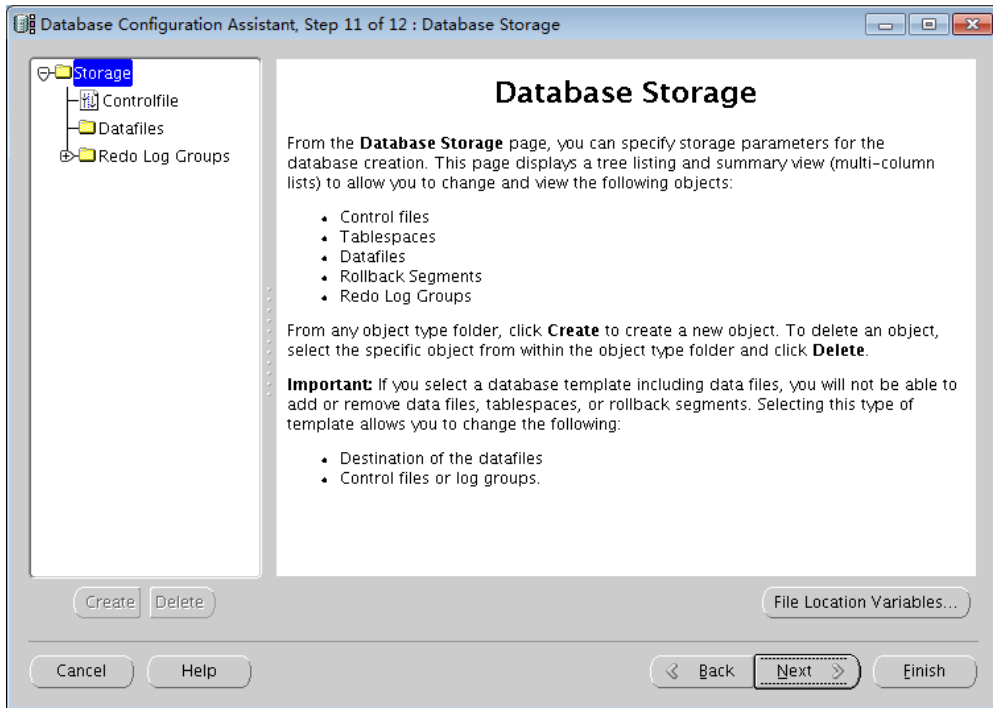
Raw Devices
Raw partitions or volumes can provide the required shared storage for Real Application Clusters (RAC) databases if you do not use Automatic Storage Management and a Cluster File System is not available. You need to have created one raw device for each datafile, control file, and log file you are planning to create in the database.

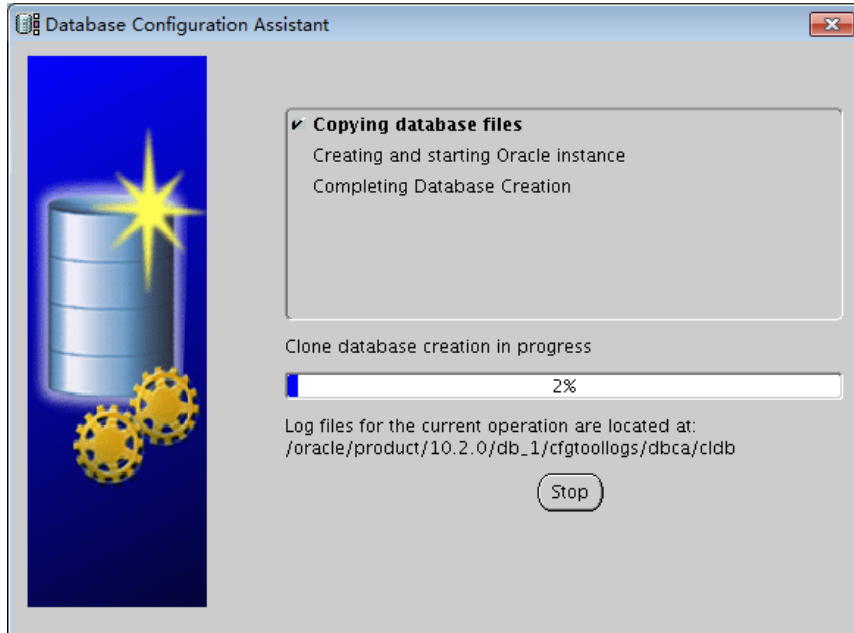
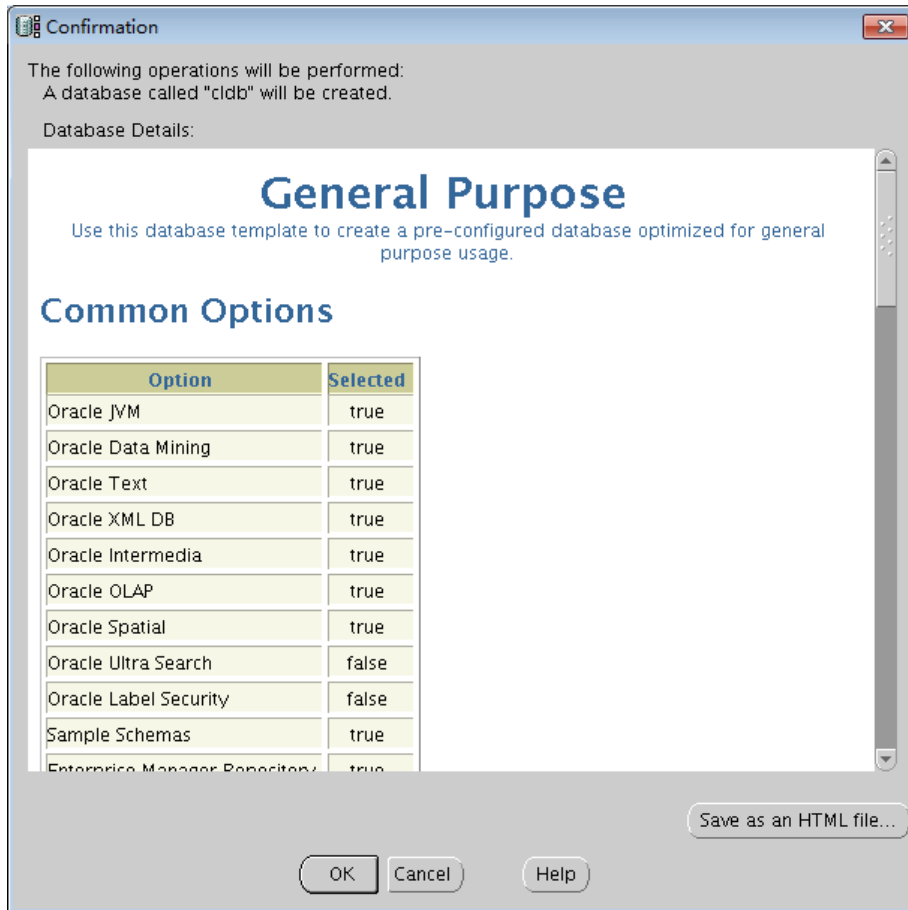
Specify Raw Devices Mapping File Browse...

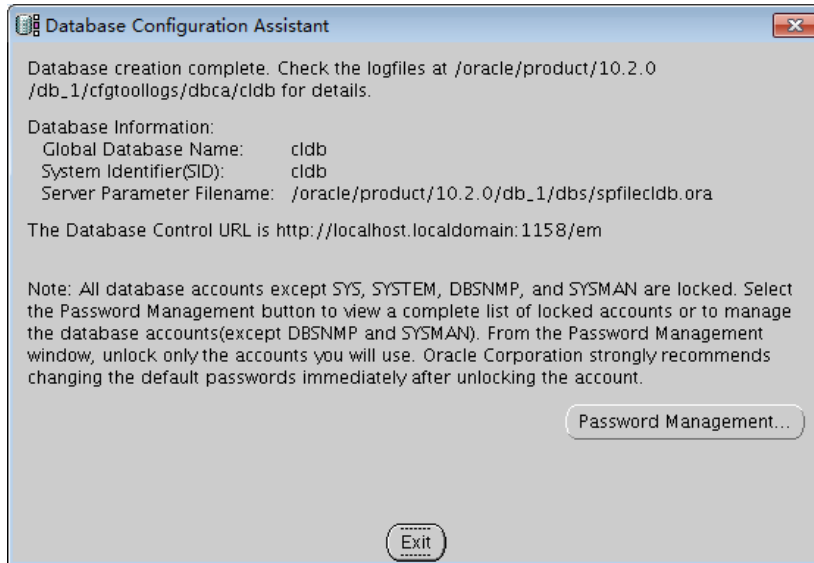
Cancel Help < Back Next > Finish











(六) 安装后配置

1. 重启后启动 Oracle

a) 手动启动

```
$ sqlplus /nolog
```

```
SQL> connect sys as sysdba
```

```
SQL> startup
```

b) 随系统启动

rc 脚本，现略。

2. 解锁 scott 用户

解锁 scott 用户，并将其密码设置为 tiger。

```
# sqlplus /nolog
SQL> connect sys as sysdba
SQL> alter user scott account unlock;
SQL> alter user scott identified by tiger;
SQL> commit;
```

验证

```
# sqlplus /nolog
SQL> connect scott/tiger;
SQL> desc emp;
```

(七) 开启企业管理器 (Oracle Enterprise Manager Console)

Emctl start|stop|status dbconsole

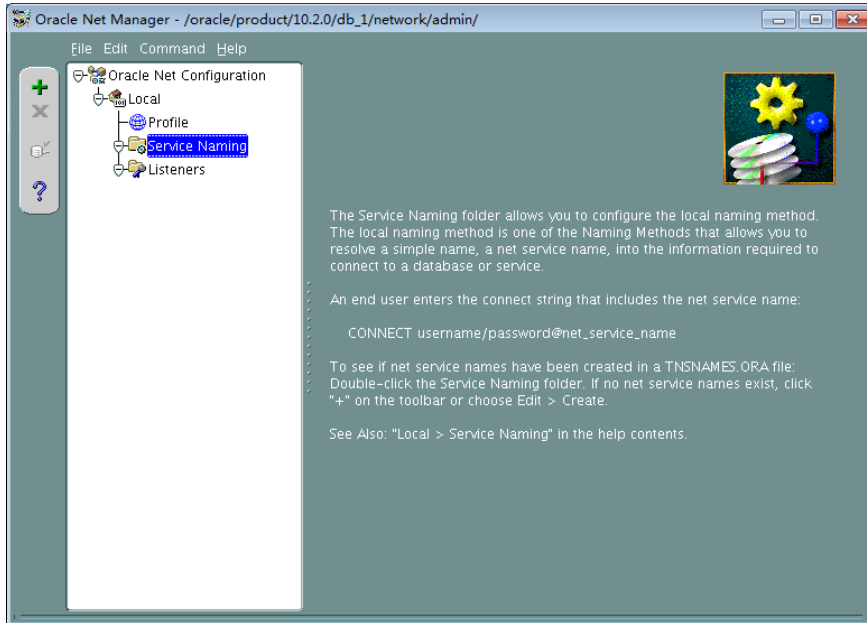
(八) 开启监听器

默认的监听器配置是 listener.ora, 在\$ORACLE_HOME/network/admin 目录下

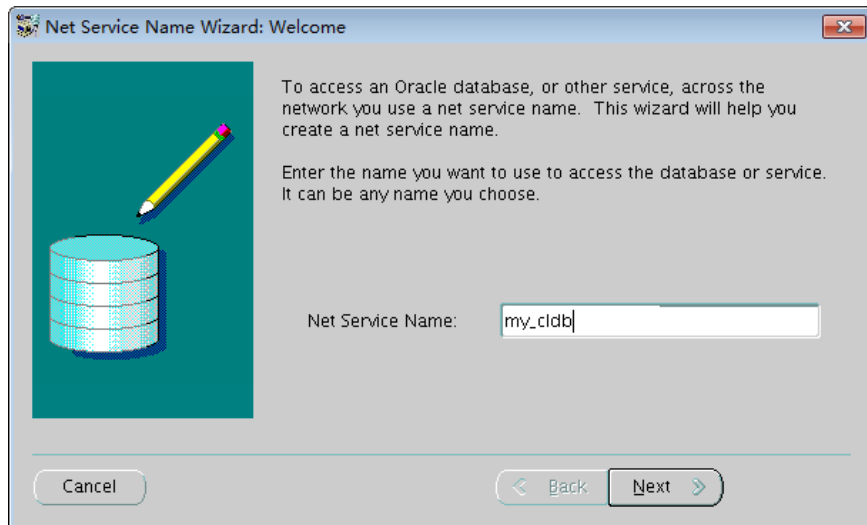
Lsnrctl start|stop|status

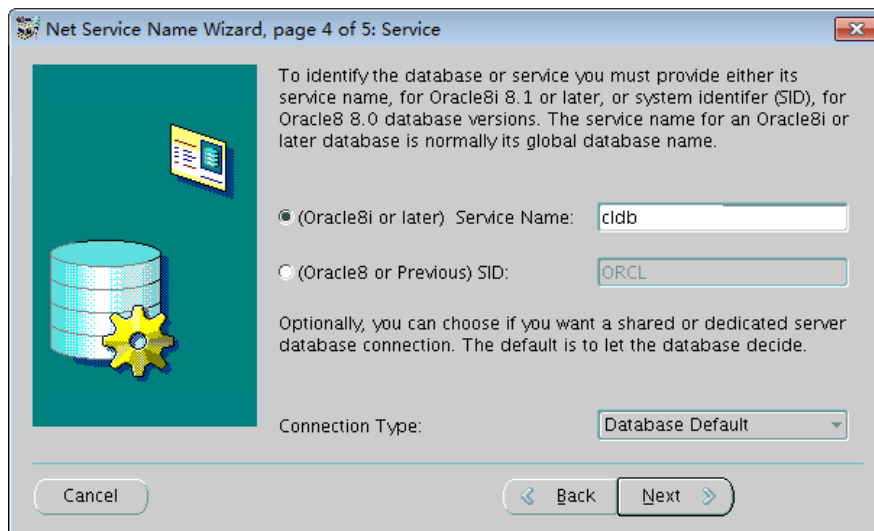
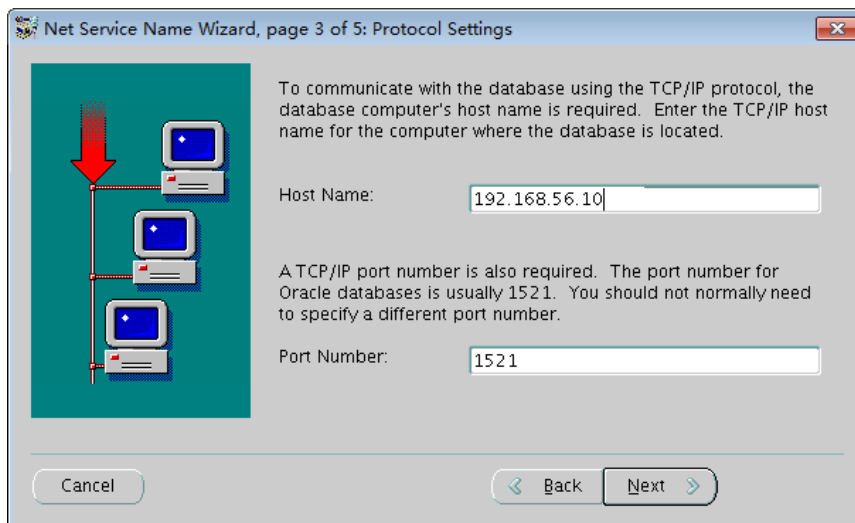
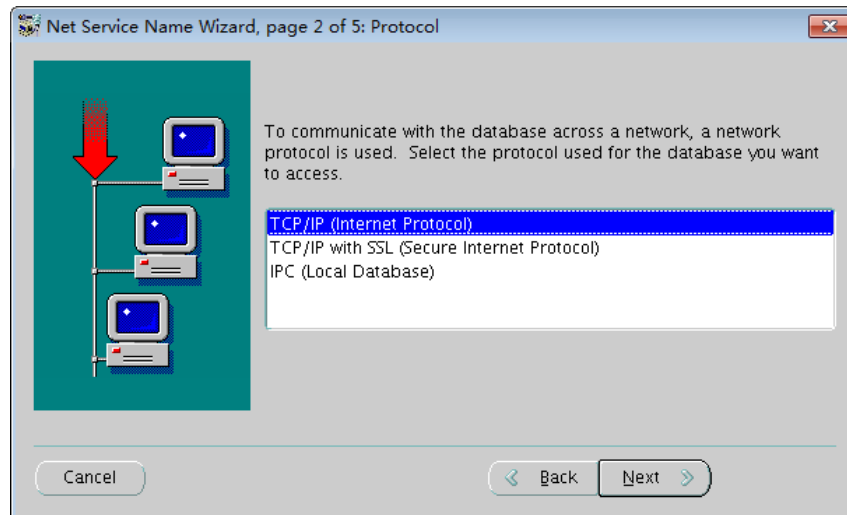
(九) 配置客户端连接

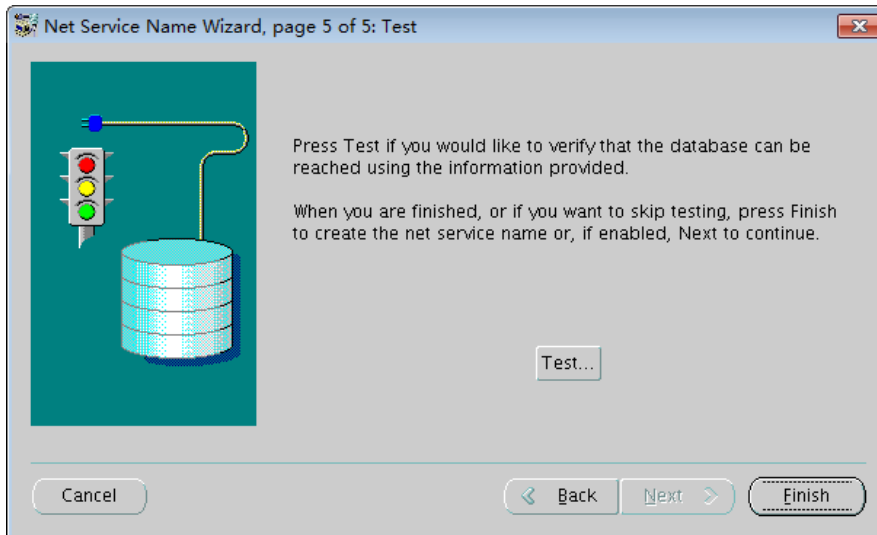
运行 netmgr



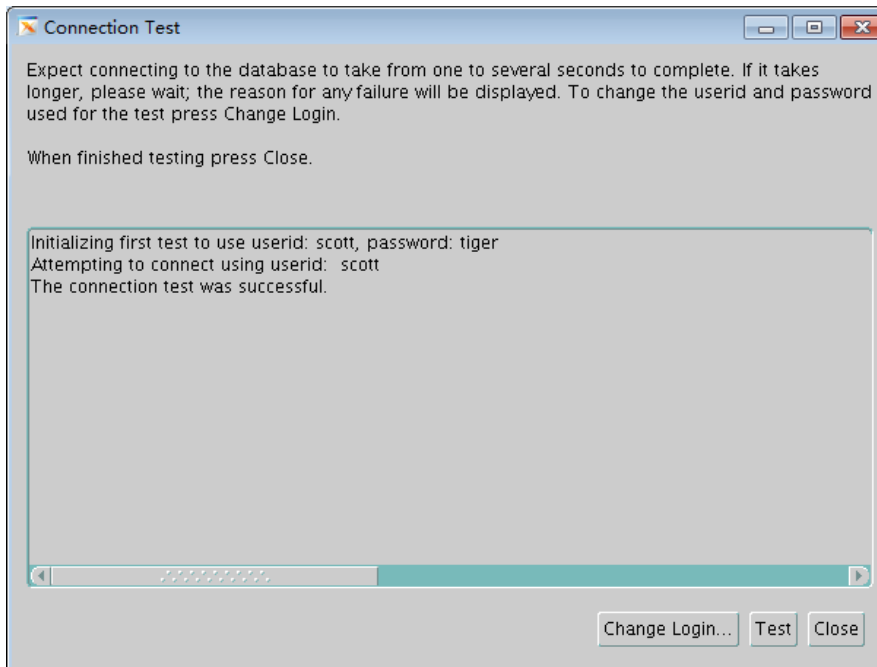
点左边的“+”







点 Test...按钮，显示如下：



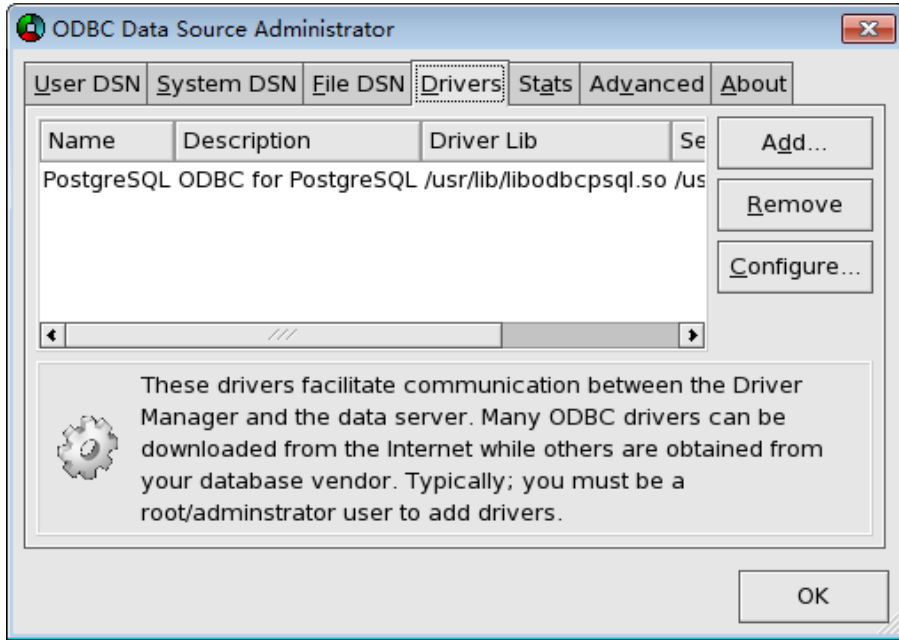
点 Close 后返回上图，点 Finish，然后从菜单 File 选 Save Network Configure 即可。

(十) 安装并配置 unixODBC

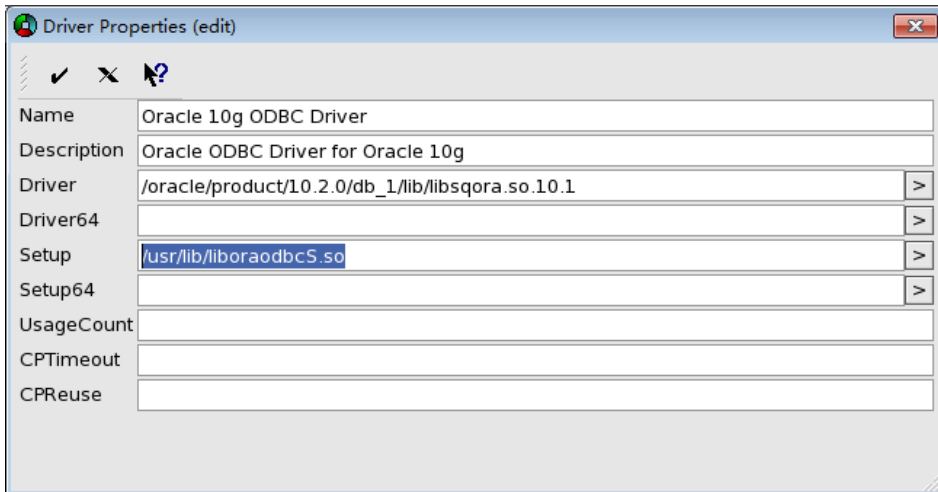
RHEL 5.5 安装盘中已经带有 unixODBC，用如下命令安装：

```
# yum -y install unixODBC.i386 unixODBC-devel.i386 unixODBC-kde.i386
```

配置 unixODBC，运行 ODBCConfig，如下图：



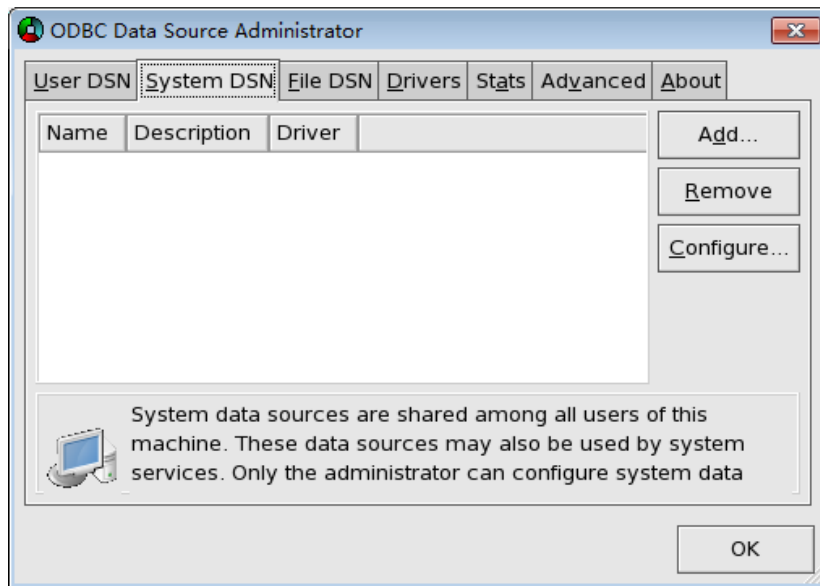
选 Drivers 标签页，并按 Add...按钮，如下图：



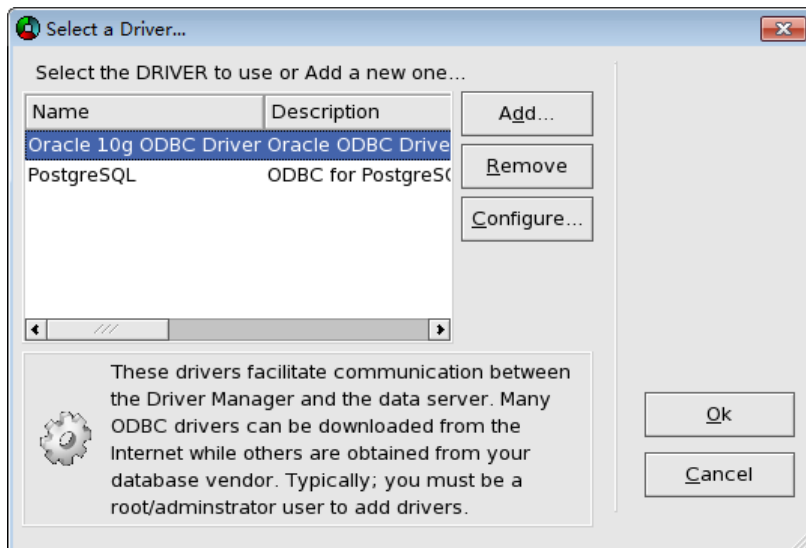
配置如上图所示，此处关键之处在于 Driver 和 Setup 行：

Driver	/oracle/product/10.2.0/db_1/lib/libsqora.so.10.1
Setup	/usr/lib/liboraodbcS.so

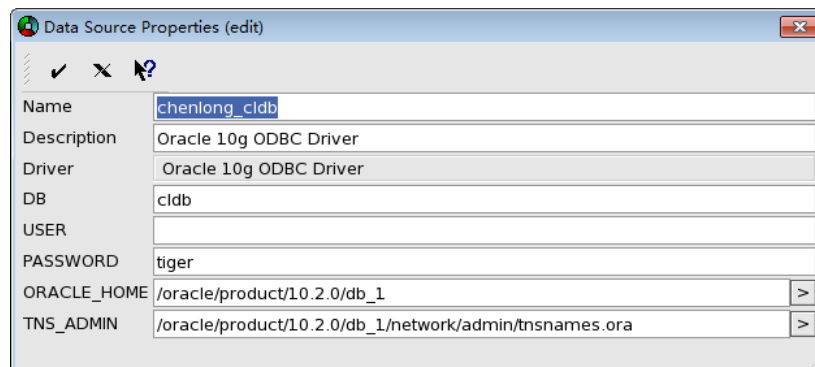
配置完后选“√”按钮，然后选“System DSN”标签页，配置 DSN，如下图：



选 “Add...” 按钮，如下图：



选择刚才添加的 “Oracle 10g ODBC Driver Oracle ODBC Driever” 后点击 “OK” 按钮，如下图：



配置如上图所示，在此需要注意 “USER”，可以先在此处填写上，如 scott，但是 Oracle 的连接参数中使用的是 UserID¹，在此处填写了之后需要到/etc/odbc.ini 中将 USER 改为 USERID，配置完毕后，

¹ 此处可参考 <http://kuroyi.net/2009/07/16/ora-01017-invalid-usernamepassword-logon-denied/>

Oracle uses “UserID” instead of “User” in the ODBC configuration of the DSN.

/etc/odbc.ini 和/etc/odbcinst.ini 文件的内容分别如下:

```
/etc/odbcinst.ini
```

```
[Oracle 10g ODBC Driver]
Description              = Oracle ODBC Driver for Oracle 10g
Driver                   = /oracle/product/10.2.0/db_1/lib/libsqora.so.10.1
Driver64                  =
Setup                     = /usr/lib/liboraodbcS.so
Setup64                   =
UsageCount                =
CPTimeout                 =
CPReuse                   =
```

```
/etc/odbc.ini
```

```
[chenlong_cldb]
Description              = Oracle 10g ODBC Driver
Driver                   = Oracle 10g ODBC Driver
DB                        = cldb
USERID                   = scott
PASSWORD                  = tiger
ORACLE_HOME               = /oracle/product/10.2.0/db_1
TNS_ADMIN                 = /oracle/product/10.2.0/db_1/network/admin/tnsnames.ora
```

用 ODBCConfig 图形化工具只是为了方便生成以上文件的内容, 如果不用 ODBCConfig 或没有安装此工具, 手工编辑/etc/odbcinst.ini 和/etc/odbc.ini 如上配置, 也是可以的。

配置完毕之后可以使用如下命令验证, 配置是否正确:

```
[oracle@localhost ~]$ isql -v chenlong_cldb
+-----+
| Connected! |
|           |
| sql-statement |
| help [tablename] |
| quit |
|           |
+-----+
SQL> select * from emp;
+-----+-----+-----+-----+-----+-----+-----+
| EMPNO | ENAME   | JOB       | MGR   | HIREDATE           | SAL   | COMM  | DEPTNO |
+-----+-----+-----+-----+-----+-----+-----+
| 7369  | SMITH   | CLERK     | 7902  | 1980-12-17 00:00:00 | 800   |      | 20     |
| 7499  | ALLEN   | SALESMAN  | 7698  | 1981-02-20 00:00:00 | 1600  | 300   | 30     |
| 7521  | WARD    | SALESMAN  | 7698  | 1981-02-22 00:00:00 | 1250  | 500   | 30     |
| 7566  | JONES   | MANAGER   | 7839  | 1981-04-02 00:00:00 | 2975  |      | 20     |
| 7654  | MARTIN | SALESMAN  | 7698  | 1981-09-28 00:00:00 | 1250  | 1400  | 30     |
| 7698  | BLAKE   | MANAGER   | 7839  | 1981-05-01 00:00:00 | 2850  |      | 30     |
| 7782  | CLARK   | MANAGER   | 7839  | 1981-06-09 00:00:00 | 2450  |      | 10     |
+-----+-----+-----+-----+-----+-----+-----+
```

7788	SCOTT	ANALYST	7566	1987-04-19 00:00:00	3000		20	
7839	KING	PRESIDENT		1981-11-17 00:00:00	5000		10	
7844	TURNER	SALESMAN	7698	1981-09-08 00:00:00	1500	0	30	
7876	ADAMS	CLERK	7788	1987-05-23 00:00:00	1100		20	
7900	JAMES	CLERK	7698	1981-12-03 00:00:00	950		30	
7902	FORD	ANALYST	7566	1981-12-03 00:00:00	3000		20	
7934	MILLER	CLERK	7782	1982-01-23 00:00:00	1300		10	

SQLRowCount returns -1
14 rows fetched
SQL>

(十一) unixODBC C 程序代码操作 Oracle 示例

实现查出所有 emp 表的 ENAME 字段，并输出，代码如下：

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#include "sql.h"
#include "sqlext.h"

int main (void)
{
    SQLHENV henv;
    SQLHDBC hdbc;
    SQLHSTMT hstmt;
    SQLINTEGER len;
    SQLCHAR szName[50];
    SQLRETURN rtn;
    SQLAllocHandle (SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv);
    SQLSetEnvAttr (henv, SQL_ATTR_ODBC_VERSION, (SQLPOINTER) SQL_OV_ODBC3, SQL_IS_INTEGER);
    SQLAllocHandle (SQL_HANDLE_DBC, henv, &hdbc);
    if ((rtn = SQLConnect(hdbc, (SQLCHAR *) "chenlong_cldb", SQL_NTS, (SQLCHAR *) "scott",
SQL_NTS, (SQLCHAR *) "tiger", SQL_NTS)) == SQL_ERROR) {
        printf ("SQLConnect Error !\n");
        return 1;
    }
    SQLAllocHandle (SQL_HANDLE_STMT, hdbc, &hstmt);
    if ((rtn = SQLExecDirect (hstmt, (SQLCHAR *) "SELECT ENAME FROM EMP", SQL_NTS)) == SQL_ERROR)
    {
        printf ("SQLExecDirect Error !\n");
        return 0;
    }
    while (SQL_NO_DATA != SQLFetch (hstmt)) {
```

```

        SQLGetData (hstmt, 1, SQL_C_CHAR, szName, 50, &len);
        printf ("%s\n", szName);
    }
    return 0;
}

```

编译方法及运行结果如下：

```

[oracle@localhost odbc_C]$ cc -o my1 my1.c -lodbc
[oracle@localhost odbc_C]$ ./my1
SMITH
ALLEN
WARD
JONES
MARTIN
BLAKE
CLARK
SCOTT
KING
TURNER
ADAMS
JAMES
FORD
MILLER

```

(十二) Oracle Pro*C 简单示例

1. 配置 pcscfg.cfg

pcscfg.cfg 文件在/oracle/product/10.2.0/db_1/precomp/admin/pcscfg.cfg，原始内容如下：

```

sys_include=(/ade/aime_rdbms_9819/oracle/precomp/public,/usr/include,/usr/lib/gcc-lib/i486-s
use-linux/2.95.3/include,/usr/lib/gcc-lib/i386-redhat-linux/3.2.3/include,/usr/lib/gcc-lib/i
386-redhat-linux7/2.96/include)
ltype=short

```

将该 pcscfg.cfg 文件拷贝至程序编译目录下，并修改为如下内容：

```

sys_include=(/oracle/product/10.2.0/db_1/precomp/public,/usr/include,/usr/lib/gcc/i386-redha
t-linux/4.1.2/include)
ltype=short

```

****注意该文件的内容应随系统不同而不同**

2. 编写简单 Pro*C 程序

```

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "sqlca.h"

int main(void)
{
    EXEC SQL INCLUDE sqlca;
}

```

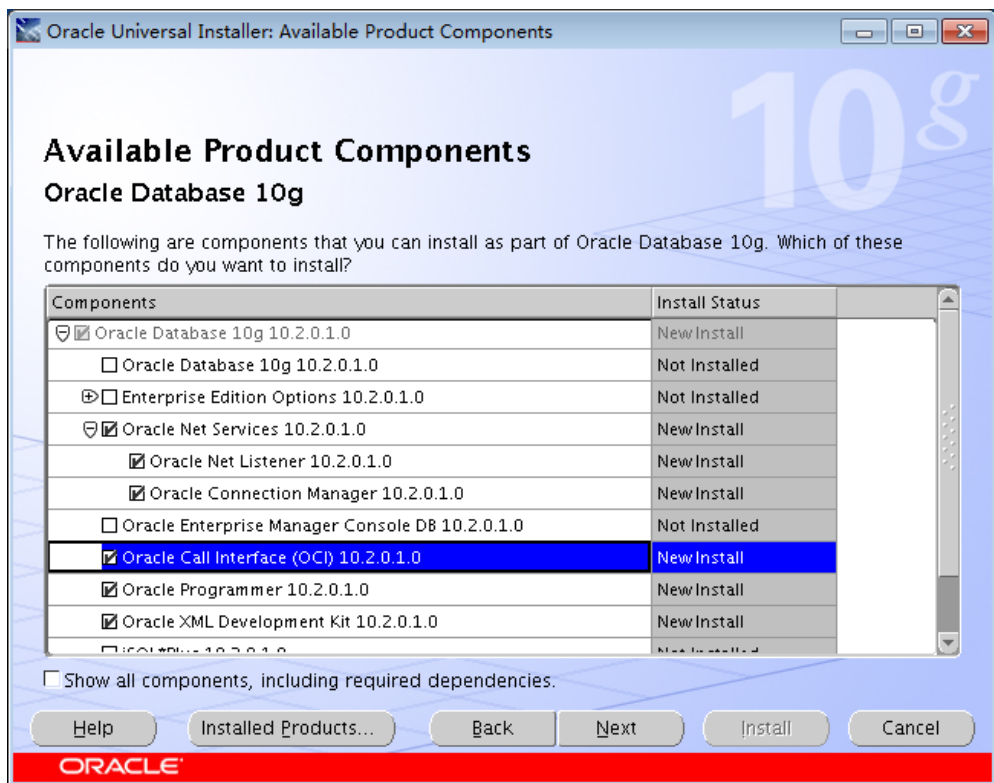
```
EXEC SQL BEGIN DECLARE SECTION;
char *uid = "scott/tiger";
EXEC SQL END DECLARE SECTION;
EXEC SQL CONNECT :uid;
if (sqlca.sqlcode == 0)
    printf("connect success!\n");
else
    printf("connect fail!\n");
return 0;
}
```

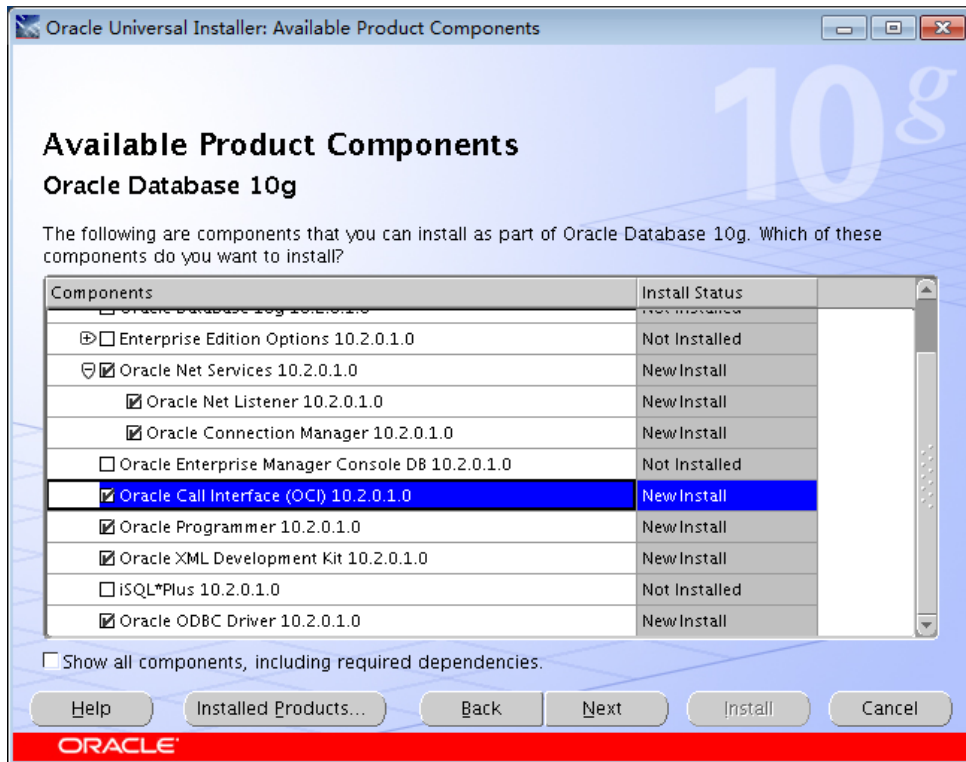
3. 编译 Pro*C 程序

```
$ proc config=pcscfg.cfg iname=alpc.pc
$ cc -I /oracle/product/10.2.0/db_1/precomp/public/ -c alpc.c
$ cc -L $ORACLE_HOME/lib -lclntsh -o alpc alpc.o
$ ./alpc
connect success!
$
```

(十三) 客户端 Oracle unixODBC 连接配置

安装 Oracle 客户端和之前的安装类似，只是选择组件时只需选择如下组件：





客户端配置 unixODBC 和本机类似，先用 netmgr 配置好 TNS，然后再配置 odbcinst.ini, odbc.ini，但是测试是提示如下信息：

```
[oracle@localhost ~]$ isql -v chenlong_cldb
[S1000][unixODBC][Oracle][ODBC][Ora]ORA-12162: TNS:net service name is incorrectly specified

[ISQL]ERROR: Could not SQLConnect
```

查资料后²，得知需要配置环境变量 TWO_TASK 值为 TNS 中所要连接的服务。本机连接使用 ORACLE_SID，连接远程的使用 TWO_TASK。配置后的 .bash_profile，有如下内容：

```
export ORACLE_BASE=/oracle/oracle
export ORACLE_HOME=$ORACLE_BASE/product/10.2.0/db_2
export LD_LIBRARY_PATH=$ORACLE_HOME/lib:/lib:/usr/lib:/usr/local/lib
export PATH=$PATH:$ORACLE_HOME/bin
export LC_ALL=en_US.UTF-8

export TWO_TASK=my_cldb
```

unixODBC 远程连接

```
/* my1.c */
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#include "sql.h"
#include "sqlext.h"
```

² <http://forums.oracle.com/forums/thread.jspa?messageID=3200753>
http://asktom.oracle.com/pls/asktom/f?p=100:11:0:::P11_QUESTION_ID:89412348059

```

int main (void)
{
    SQLHENV henv;
    SQLHDBC hdbc;
    SQLHSTMT hstmt;
    SQLINTEGER len;
    SQLCHAR szName[50];
    SQLRETURN rtn;
    SQLAllocHandle (SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv);
    SQLSetEnvAttr (henv, SQL_ATTR_ODBC_VERSION, (SQLPOINTER) SQL_OV_ODBC3,
SQL_IS_INTEGER);
    SQLAllocHandle (SQL_HANDLE_DBC, henv, &hdbc);
    if ((rtn = SQLConnect(hdbc, (SQLCHAR *) "chenlong_cldb", SQL_NTS, (SQLCHAR *) "scott",
SQL_NTS, (SQLCHAR *) "tiger", SQL_NTS)) == SQL_ERROR) {
        printf ("SQLConnect Error !\n");
        return 1;
    }
    SQLAllocHandle (SQL_HANDLE_STMT, hdbc, &hstmt);
    if ((rtn = SQLExecDirect (hstmt, (SQLCHAR *) "SELECT ENAME FROM EMP", SQL_NTS)) ==
SQL_ERROR) {
        printf ("SQLExecDirect Error !\n");
        return 0;
    }
    while (SQL_NO_DATA != SQLFetch (hstmt)) {
        SQLGetData (hstmt, 1, SQL_C_CHAR, szName, 50, &len);
        printf ("%s\n", szName);
    }
    return 0;
}

```

```
$ cc -o my1 my1.c -lodbc
```

```
$ ./my1
```

```
SQLConnect Error !
```

Pro*C 远程连接

```

/* alpc.pc */
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include "sqlca.h"

int main(void)
{
    EXEC SQL INCLUDE sqlca;

```

```

EXEC SQL BEGIN DECLARE SECTION;
char *username = "scott";
char *password = "tiger";
char *db_name = "my_cldb";
char db_conn_string[] = "scott/tiger@my_cldb";
EXEC SQL END DECLARE SECTION;
EXEC SQL CONNECT :username IDENTIFIED BY :password USING :db_name;
//EXEC SQL CONNECT :db_conn_string;
if (sqlca.sqlcode == 0)
    printf("connect success!\n");
else
    printf("connect fail!\n");
return 0;
}

$ proc config=pcscfg.cfg iname=alpc.pc
$ cc -I /oracle/oracle/product/10.2.0/db_2/precomp/public/ -L $ORACLE_HOME/lib -lcintsh -o alpc
alpc.c
./alpc
connect success!

```

(十四) 中文配置

安装 Oracle 10g 的时候无论 LC_ALL、LANG、NLS_LANG 如何配置，runInstaller 都无法显示中文，好像是缺乏相应中文编码的字体，由于不想使用 GB2312、GBK、GB18030 等编码，故将 LC_ALL 设置为 en_US.UTF-8，用英文界面安装（runInstaller）和使用（dbca）Oracle，在安装过程中选择“Product Languages”将简体/繁体中文选上，并配置 NLS_LANG 为 SIMPLIFIED CHINESE_CHINA.UTF8。sqlplus 等工具即可使用中文。验证如下：

.bash_profile 中语言配置如下：

```

export NLS_LANG='SIMPLIFIED CHINESE'_CHINA.UTF8
export LC_ALL=en_US.UTF-8

```

```

$ sqlplus /nolog
SQL> connect scott/tiger;
已连接。
SQL> CREATE TABLE S(SNO VARCHAR2(20) NOT NULL, SN VARCHAR2(40) NOT NULL, SEX VARCHAR2(20) NULL, AGE
INT NULL, DEPT VARCHAR2(30) NULL);
SQL> INSERT INTO S VALUES('S2','钱尔','男',18,'信息');
SQL> INSERT INTO S VALUES('S2','钱尔','男',18,'信息');
SQL> select * from S;

SNO
-----
SN
-----
SEX
AGE

```


DEPT	
S2	
钱尔	
男	18
信息	
SNO	
SN	
SEX	AGE
DEPT	
S2	
钱尔	
男	18
信息	

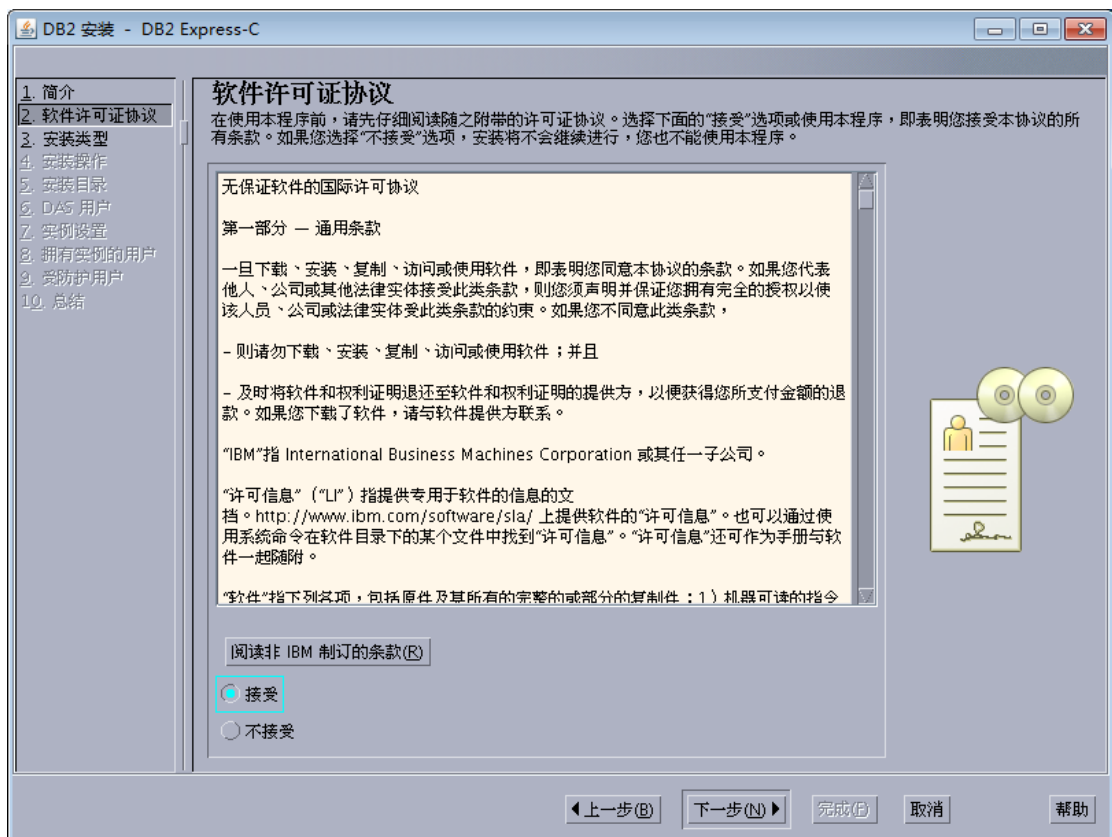
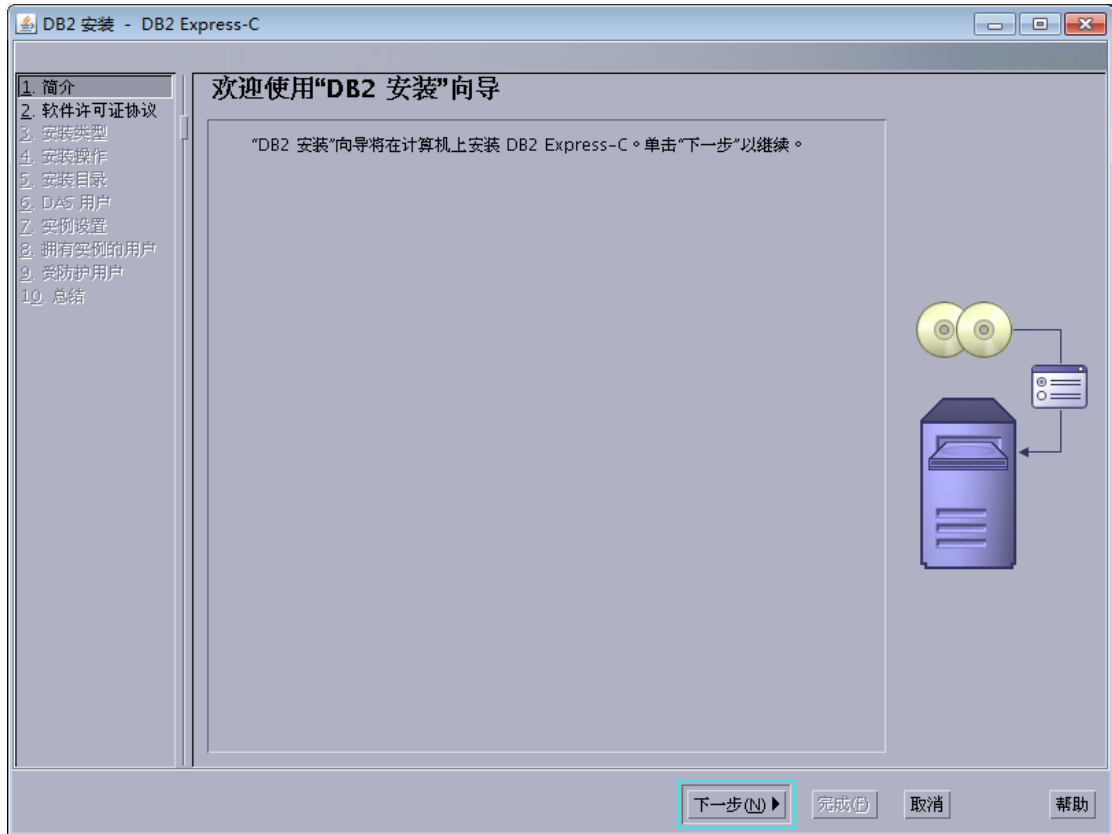
(十五) 安装 DB2 Express-C

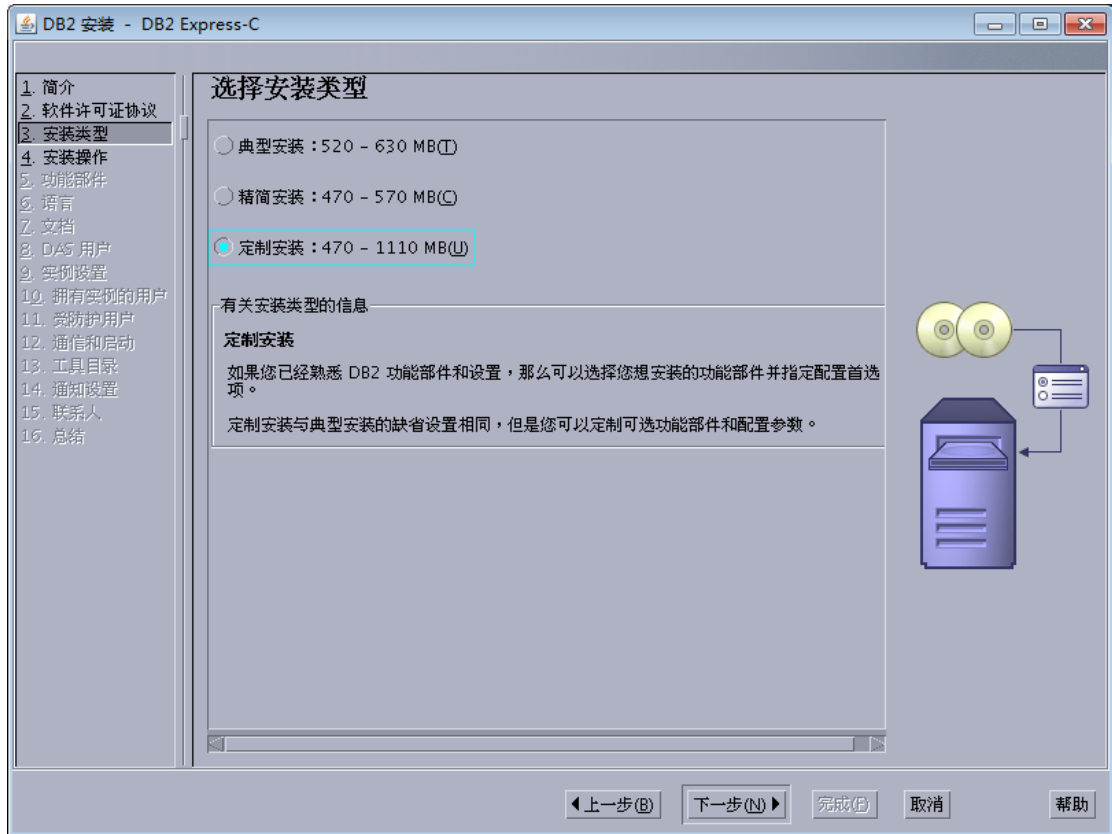
在虚拟中新添加一块硬盘，大小 10GB，将其挂在到/db2 目录下。

此处为了学习，安装 DB2 Express-C 9.7 版本的 DB2，将安装文件上传到服务器上，用 root 登录，执行远程安装，在安装之前可运行 db2prereqcheck，查看是否满足 db2 安装所需的包。

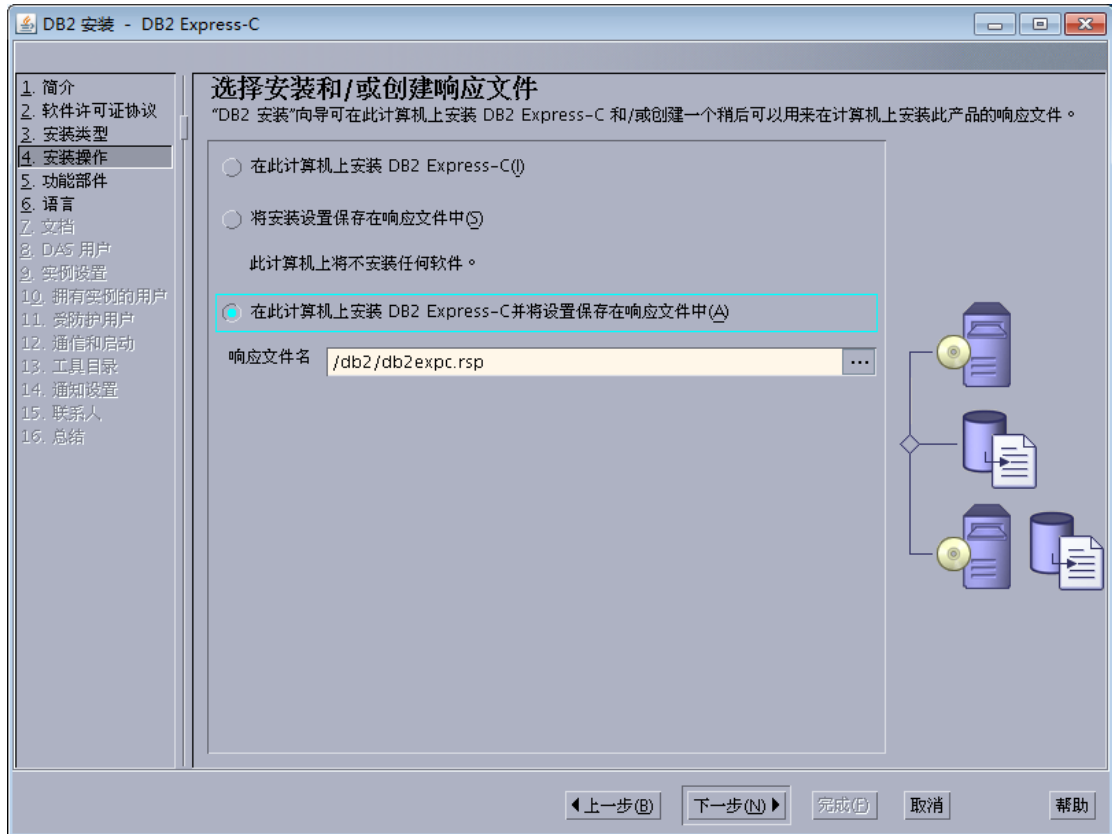
```
$ export DISPLAY=192.168.56.1:0.0
$ ./db2setup
```





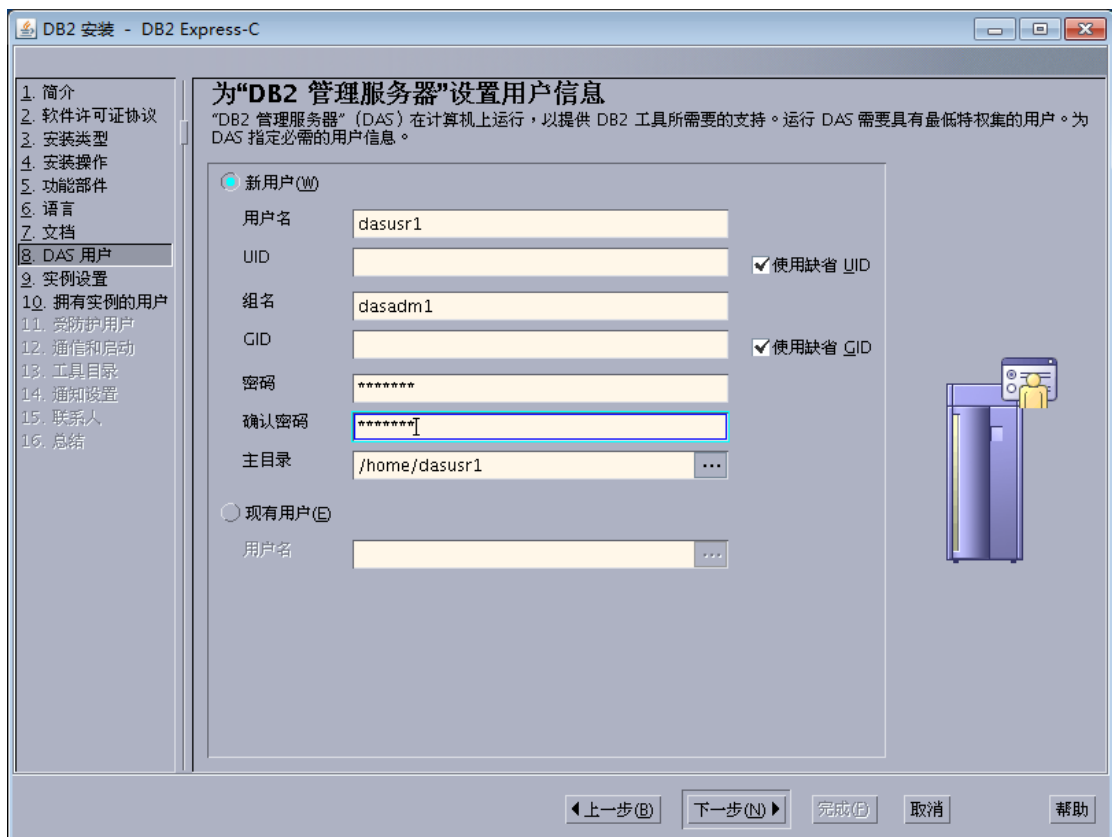
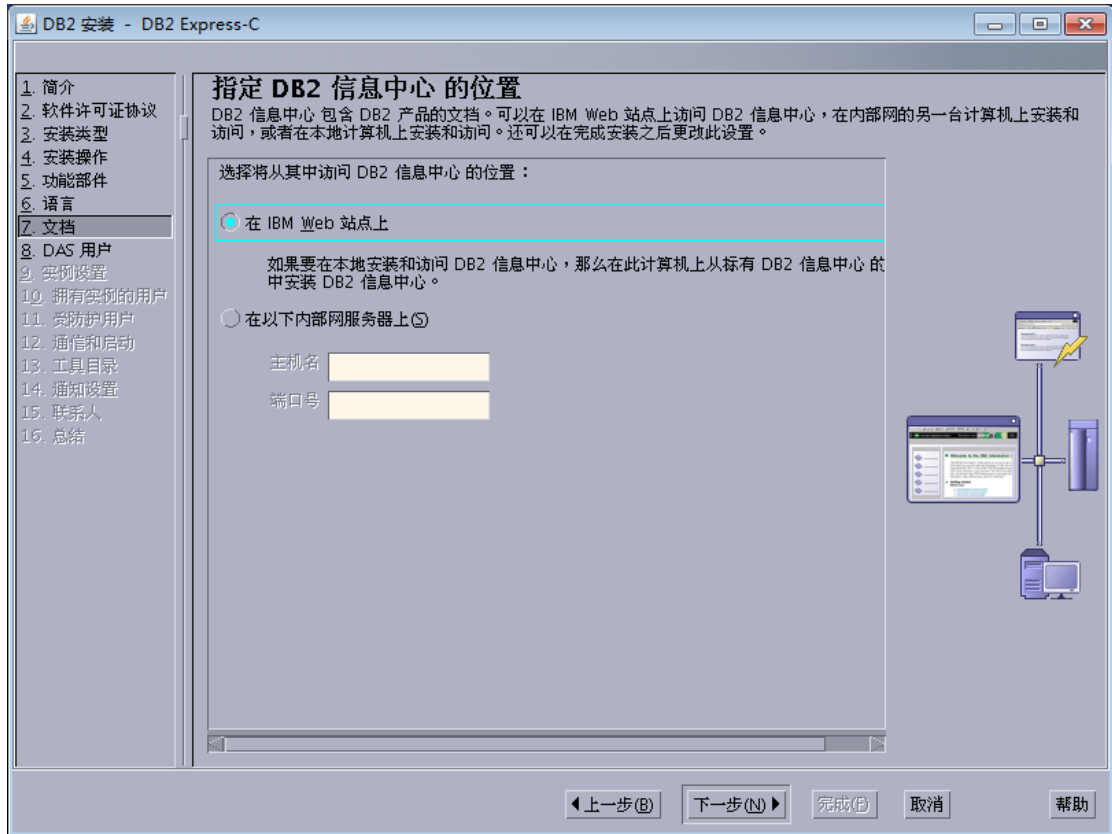


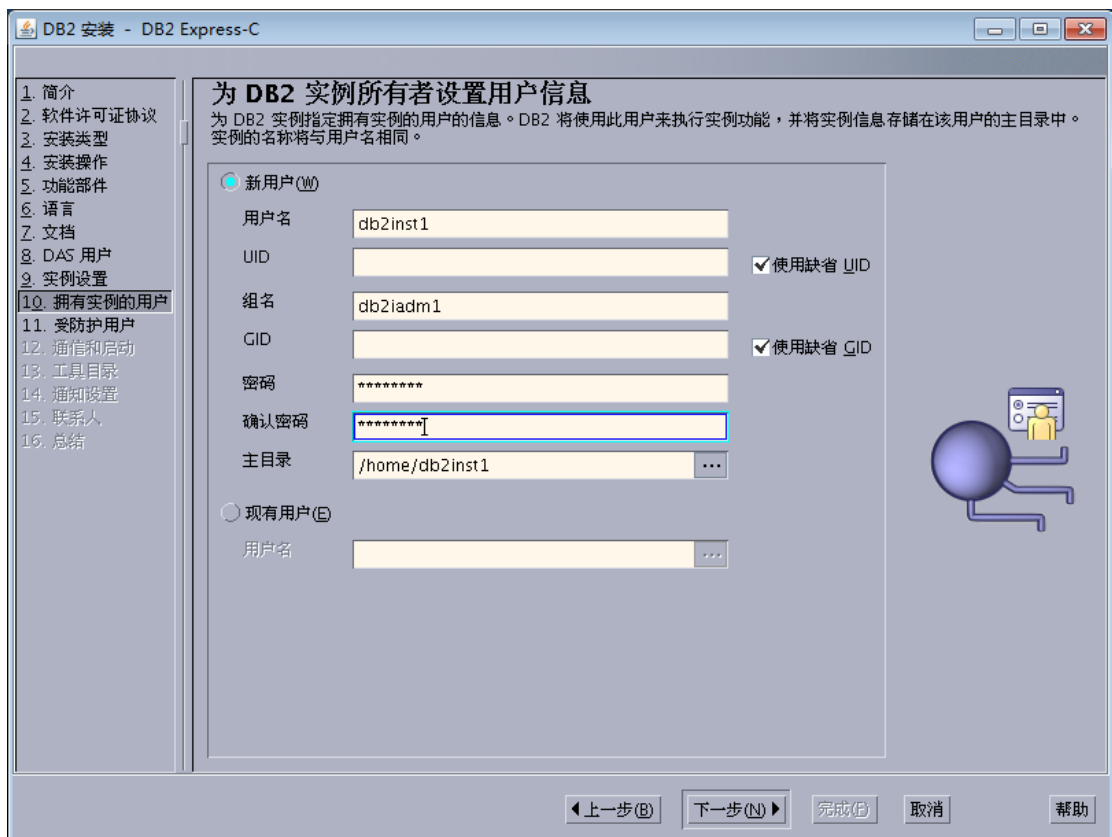
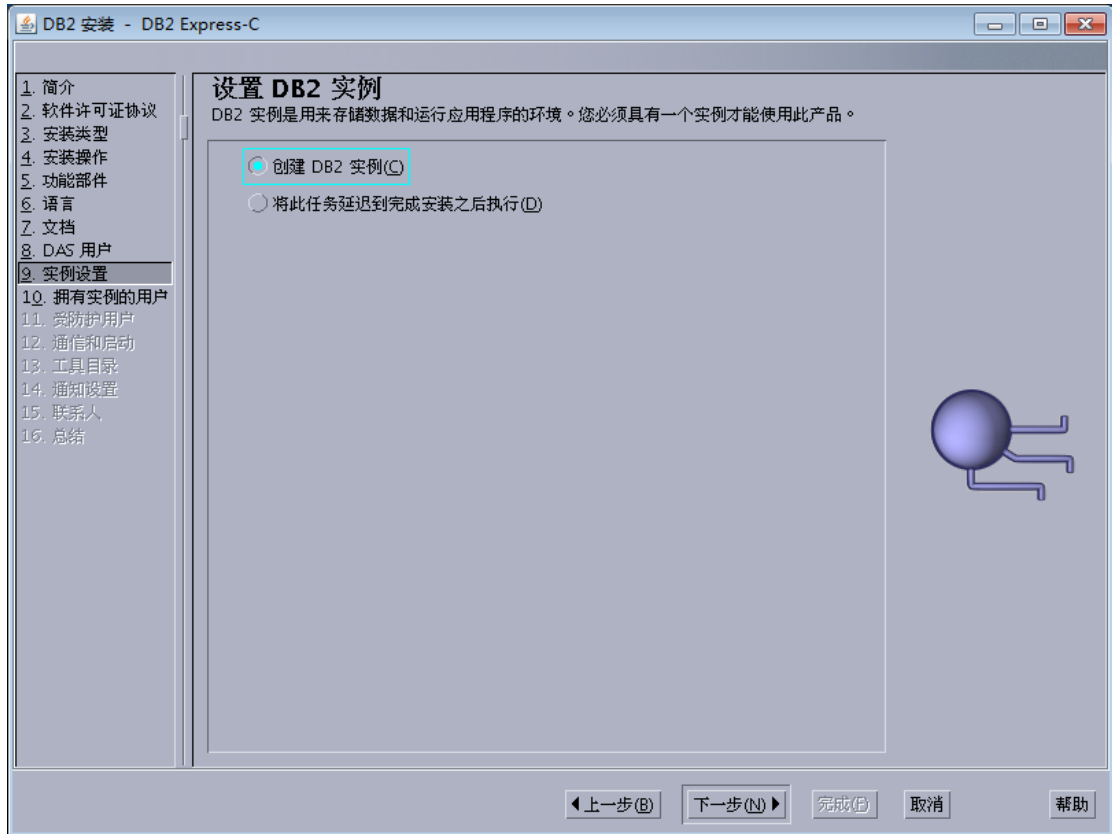
在此处需注意选择“定制安装”

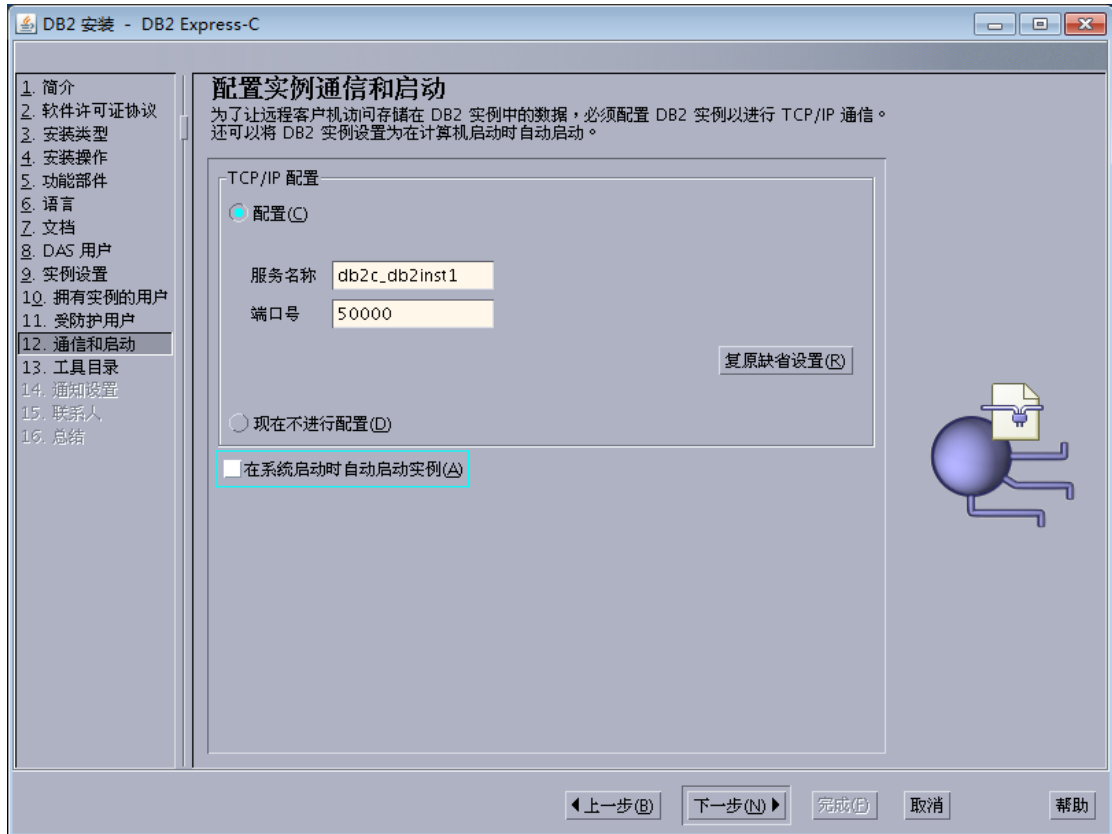
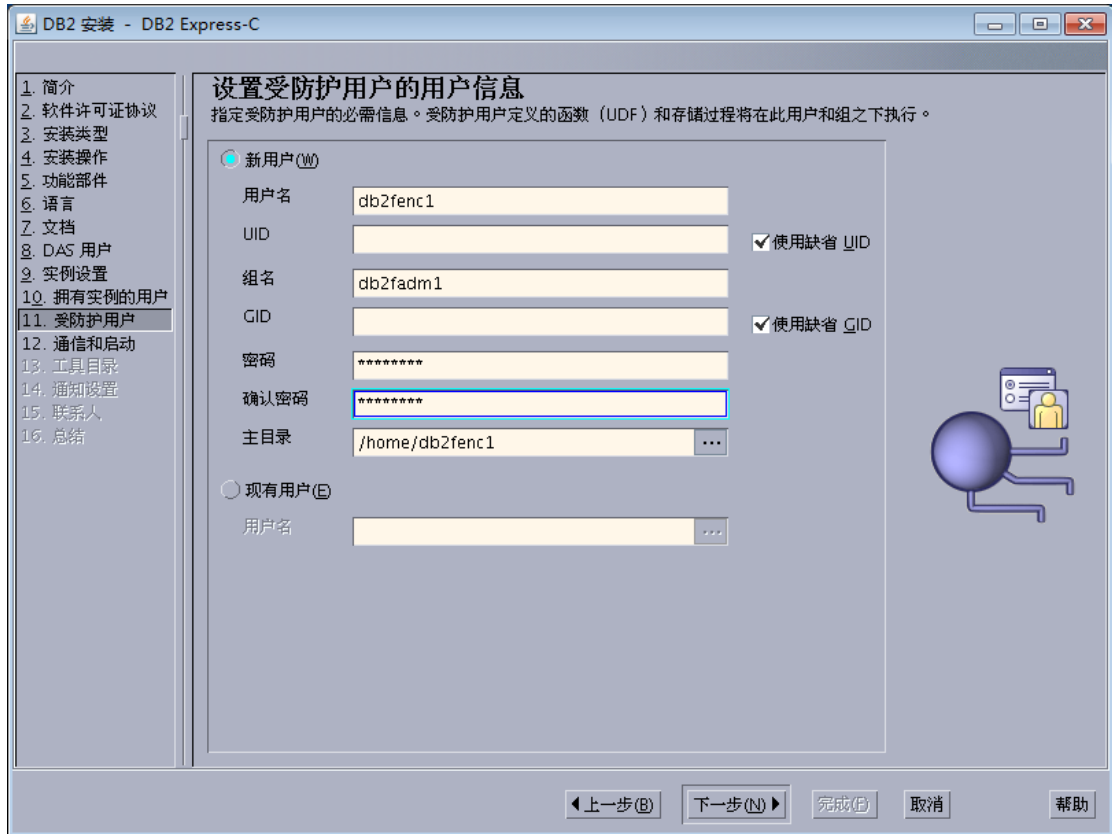


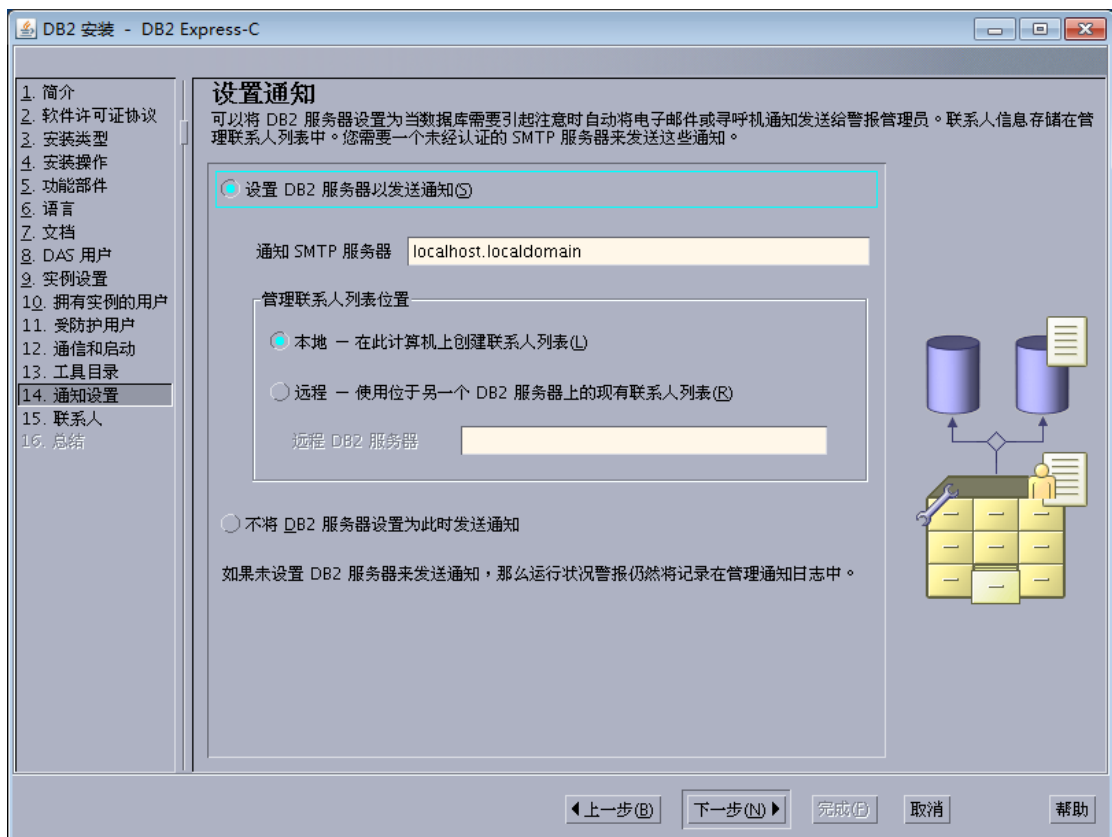
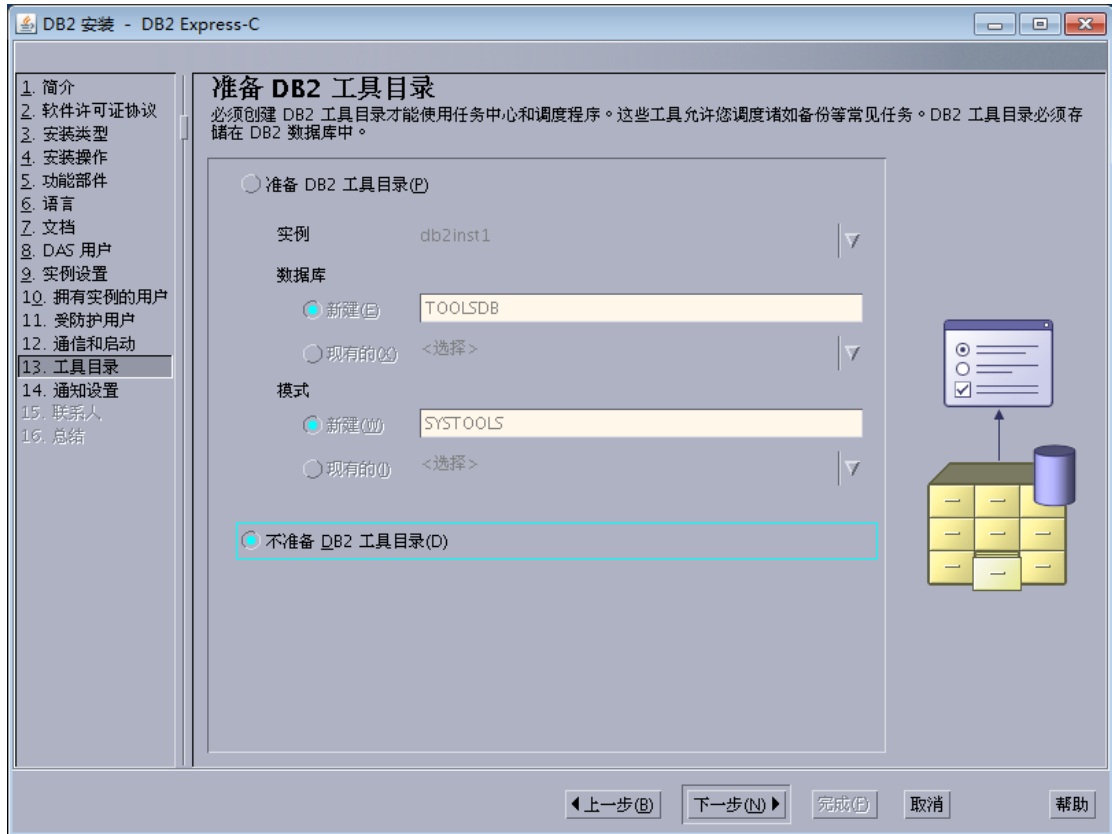
在此处需要注意，悬赏“应用程序开发工具”

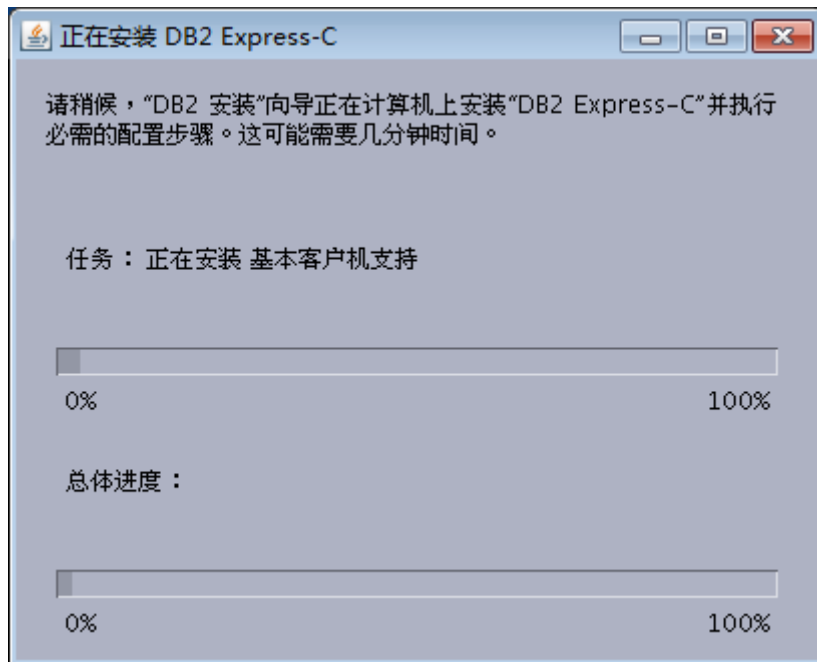
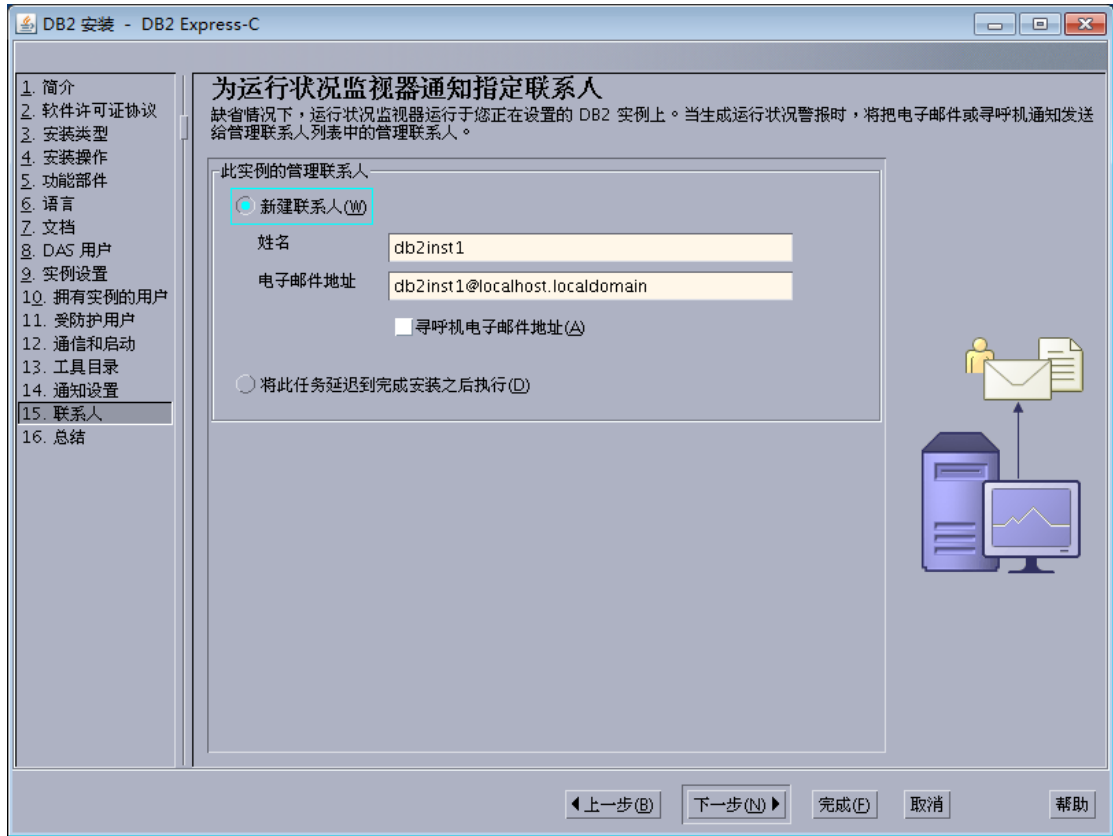


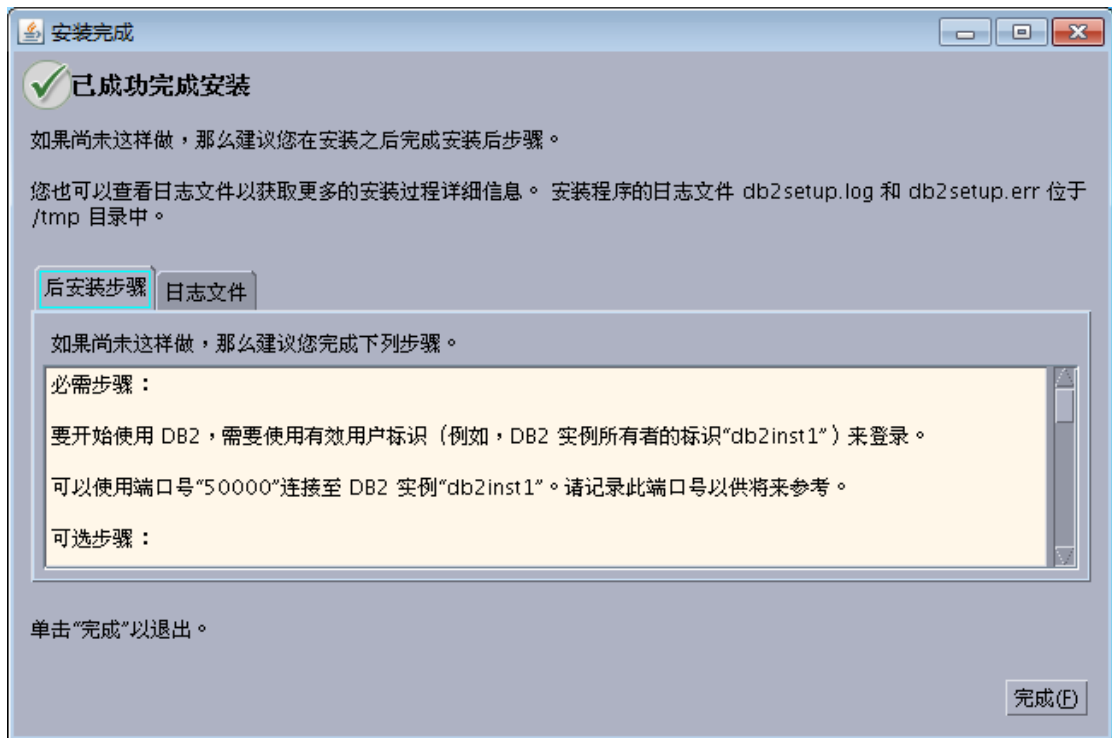












重启系统, 由于我们在安装 DB2 的时候, 没有选中随系统一起启动, 故在需要使用 db2start 启动 db2。

关闭数据库使用 db2stop 命令, 如果提示 “SQL1025N 未停止数据库, 因为数据库仍是活动的。”, 可运行 db2 list application 查看, 并运行 db2 force application all 强制断开, 并再次执行 db2stop 即可。

(十六) DB2 创建 sample 数据库

使用 db2inst1 用户登录, 运行命令

```
$ db2sampl
```

(十七) ODBC C 程序代码操作 DB2 示例

DB2 使用 ODBC 可以使用自带的 ODBC CLO 和 unixODBC, 其中 unixODBC 需要配置 odbc.ini 和 odbcinst.ini, 自带的则不需要, 直接使用即可。分别介绍这两种情况

1. 使用 unixODBC

首先必须安装 unixODBC, 从 RHEL5 安装盘中安装即可, 然后配置 odbc.ini 和 odbcinst.ini, 如下:

```
odbcinst.ini
[DB2 ODBC Driver]
Description           = ODBC for DB2
Driver                 = /db2/ibm/db2/V9.7/lib32/libdb2.so
FileUsage              = 1
DontDLClose           = 1
TraceFile              = /tmp/db2odbc.log
Trace                  = Yes
```

```
odbc.ini
[sample]
Description=Sample Database
```

配置好后可使用 isql 测试，如下：

```
[db2inst1@localhost ~]$ isql -v sample
+-----+
| Connected! |
|           |
| sql-statement |
| help [tablename] |
| quit |
|           |
+-----+

SQL> select * from emp
+-----+-----+-----+-----+-----+-----+-----+-----+
| EMPNO | FIRSTNME | MIDINIT| LASTNAME | WORKDEPT| PHONENO| HIREDATE | JOB |
EDLEVEL| SEX| BIRTHDATE | SALARY | BONUS | COMM |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 000010| CHRISTINE | I | HAAS | A00 | 3978 | 1995-01-01| PRES | 18
| F | 1963-08-24| 152750.00 | 1000.00 | 4220.00 |
| 000020| MICHAEL | L | THOMPSON | B01 | 3476 | 2003-10-10| MANAGER | 18
| M | 1978-02-02| 94250.00 | 800.00 | 3300.00 |
| 000030| SALLY | A | KWAN | C01 | 4738 | 2005-04-05| MANAGER | 20
| F | 1971-05-11| 98250.00 | 800.00 | 3060.00 |
| 000050| JOHN | B | GEYER | E01 | 6789 | 1979-08-17| MANAGER | 16
| M | 1955-09-15| 80175.00 | 800.00 | 3214.00 |
| 000060| IRVING | F | STERN | D11 | 6423 | 2003-09-14| MANAGER | 16
| M | 1975-07-07| 72250.00 | 500.00 | 2580.00 |
| 000070| EVA | D | PULASKI | D21 | 7831 | 2005-09-30| MANAGER | 16
| F | 2003-05-26| 96170.00 | 700.00 | 2893.00 |
| 000090| EILEEN | W | HENDERSON | E11 | 5498 | 2000-08-15| MANAGER | 16
| F | 1971-05-15| 89750.00 | 600.00 | 2380.00 |
| 000100| THEODORE | Q | SPENSER | E21 | 0972 | 2000-06-19| MANAGER | 14
| M | 1980-12-18| 86150.00 | 500.00 | 2092.00 |
| 000110| VINCENZO | G | LUCCHESI | A00 | 3490 | 1988-05-16| SALESREP | 19
| M | 1959-11-05| 66500.00 | 900.00 | 3720.00 |
| 000120| SEAN | | O'CONNELL | A00 | 2167 | 1993-12-05| CLERK | 14
| M | 1972-10-18| 49250.00 | 600.00 | 2340.00 |
| 000130| DELORES | M | QUINTANA | C01 | 4578 | 2001-07-28| ANALYST | 16
| F | 1955-09-15| 73800.00 | 500.00 | 1904.00 |
| 000140| HEATHER | A | NICHOLLS | C01 | 1793 | 2006-12-15| ANALYST | 18
| F | 1976-01-19| 68420.00 | 600.00 | 2274.00 |
| 000150| BRUCE | | ADAMSON | D11 | 4510 | 2002-02-12| DESIGNER | 16
| M | 1977-05-17| 55280.00 | 500.00 | 2022.00 |
```

000160	ELIZABETH	R	PIANKA	D11	3782	2006-10-11	DESIGNER	17
F	1980-04-12	62250.00	400.00	1780.00				
000170	MASATOSHI	J	YOSHIMURA	D11	2890	1999-09-15	DESIGNER	16
M	1981-01-05	44680.00	500.00	1974.00				
000180	MARILYN	S	SCOUTTEN	D11	1682	2003-07-07	DESIGNER	17
F	1979-02-21	51340.00	500.00	1707.00				
000190	JAMES	H	WALKER	D11	2986	2004-07-26	DESIGNER	16
M	1982-06-25	50450.00	400.00	1636.00				
000200	DAVID		BROWN	D11	4501	2002-03-03	DESIGNER	16
M	1971-05-29	57740.00	600.00	2217.00				
000210	WILLIAM	T	JONES	D11	0942	1998-04-11	DESIGNER	17
M	2003-02-23	68270.00	400.00	1462.00				
000220	JENNIFER	K	LUTZ	D11	0672	1998-08-29	DESIGNER	18
F	1978-03-19	49840.00	600.00	2387.00				
000230	JAMES	J	JEFFERSON	D21	2094	1996-11-21	CLERK	14
M	1980-05-30	42180.00	400.00	1774.00				
000240	SALVATORE	M	MARINO	D21	3780	2004-12-05	CLERK	17
M	2002-03-31	48760.00	600.00	2301.00				
000250	DANIEL	S	SMITH	D21	0961	1999-10-30	CLERK	15
M	1969-11-12	49180.00	400.00	1534.00				
000260	SYBIL	P	JOHNSON	D21	8953	2005-09-11	CLERK	16
F	1976-10-05	47250.00	300.00	1380.00				
000270	MARIA	L	PEREZ	D21	9001	2006-09-30	CLERK	15
F	2003-05-26	37380.00	500.00	2190.00				
000280	ETHEL	R	SCHNEIDER	E11	8997	1997-03-24	OPERATOR	17
F	1976-03-28	36250.00	500.00	2100.00				
000290	JOHN	R	PARKER	E11	4502	2006-05-30	OPERATOR	12
M	1985-07-09	35340.00	300.00	1227.00				
000300	PHILIP	X	SMITH	E11	2095	2002-06-19	OPERATOR	14
M	1976-10-27	37750.00	400.00	1420.00				
000310	MAUDE	F	SETRIGHT	E11	3332	1994-09-12	OPERATOR	12
F	1961-04-21	35900.00	300.00	1272.00				
000320	RAMLAL	V	MEHTA	E21	9990	1995-07-07	FIELDREP	16
M	1962-08-11	39950.00	400.00	1596.00				
000330	WING		LEE	E21	2103	2006-02-23	FIELDREP	14
M	1971-07-18	45370.00	500.00	2030.00				
000340	JASON	R	GOUNOT	E21	5698	1977-05-05	FIELDREP	16
M	1956-05-17	43840.00	500.00	1907.00				
200010	DIAN	J	HEMMINGER	A00	3978	1995-01-01	SALESREP	18
F	1973-08-14	46500.00	1000.00	4220.00				
200120	GREG		ORLANDO	A00	2167	2002-05-05	CLERK	14
M	1972-10-18	39250.00	600.00	2340.00				
200140	KIM	N	NATZ	C01	1793	2006-12-15	ANALYST	18
F	1976-01-19	68420.00	600.00	2274.00				

	200170		KIYOSHI				YAMAMOTO		D11		2890		2005-09-15		DESIGNER		16
	M		1981-01-05		64680.00		500.00		1974.00								
	200220		REBA		K		JOHN		D11		0672		2005-08-29		DESIGNER		18
	F		1978-03-19		69840.00		600.00		2387.00								
	200240		ROBERT		M		MONTEVERDE		D21		3780		2004-12-05		CLERK		17
	M		1984-03-31		37760.00		600.00		2301.00								
	200280		EILEEN		R		SCHWARTZ		E11		8997		1997-03-24		OPERATOR		17
	F		1966-03-28		46250.00		500.00		2100.00								
	200310		MICHELLE		F		SPRINGER		E11		3332		1994-09-12		OPERATOR		12
	F		1961-04-21		35900.00		300.00		1272.00								
	200330		HELENA				WONG		E21		2103		2006-02-23		FIELDREP		14
	F		1971-07-18		35370.00		500.00		2030.00								
	200340		ROY		R		ALONZO		E21		5698		1997-07-05		FIELDREP		16
	M		1956-05-17		31840.00		500.00		1907.00								
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+																	
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+																	
SQLRowCount returns -1																	
42 rows fetched																	

程序代码，如下：

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#include "sql.h"
#include "sqlext.h"

int main (void)
{
    SQLHENV henv;
    SQLHDBC hdbc;
    SQLHSTMT hstmt;
    SQLINTEGER len;
    SQLCHAR szName[50];
    SQLRETURN rtn;
    SQLAllocHandle (SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv);
    SQLSetEnvAttr (henv, SQL_ATTR_ODBC_VERSION, (SQLPOINTER) SQL_OV_ODBC3,
SQL_IS_INTEGER);
    SQLAllocHandle (SQL_HANDLE_DBC, henv, &hdbc);
    if ((rtn = SQLConnect(hdbc, (SQLCHAR *) "sample", SQL_NTS, (SQLCHAR *) "db2inst1",
SQL_NTS, (SQLCHAR *) "db2inst1", SQL_NTS)) == SQL_ERROR) {
        printf ("SQLConnect Error !\n");
        return 1;
    }
    SQLAllocHandle (SQL_HANDLE_STMT, hdbc, &hstmt);
```

```

        if ((rtn = SQLExecDirect (hstmt, (SQLCHAR *) "SELECT FIRSTNAME FROM EMP", SQL_NTS)) ==
SQL_ERROR) {
            printf ("SQLExecDirect Error !\n");
            return 0;
        }
        while (SQL_NO_DATA != SQLFetch (hstmt)){
            SQLGetData (hstmt, 1, SQL_C_CHAR, szName, 50, &len);
            printf ("%s\n", szName);
        }
        return 0;
    }
}

```

```

$ cc -o a1 a1.c -lodbc
$ ./a1

```

2. 使用 DB2 ODBC CLI

使用 CLI 无需配置 oebdinst.ini、odbc.ini，只需链接的时候链接 DB2 安装目录下 lib 目录中的 libdb2.so 即可，同样的代码，编译链接方法如下：

```

$ cc -o a1 -L /db2/ibm/db2/V9.7/lib32/ -ldb2 a1.c
$ ./a1

```

3. DB2 和 Oracle 使用 ODBC 的区别

- a) DB2 可以使用自带的 ODBC CLI，而 Oracle 随自带 ODBC 驱动，但是得通过 unixODBC 连接。
- b) Oracle 在 odbc.ini 中配置的是 DSN 名字，而 DB2 在此配置的是数据库名字；同样在代码中的 SQLConnect 函数可看出，Oracle 第二个参数是 DSN 名字，而 DB2 的第二个参数是数据库名，这点和配置文件 odbc.ini 中的配置相对应。

(十八) DB2 Embedded SQL 代码示例

如下：

```

/* myeqal_1.sqc */
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#include "sqlca.h"

EXEC SQL INCLUDE SQLCA;

int main(void)
{
    EXEC SQL BEGIN DECLARE SECTION;
    char firstname[13];
    char userid[9];
    char passwd[19];
    EXEC SQL END DECLARE SECTION;
}

```

```

EXEC SQL CONNECT TO sample;
EXEC SQL SELECT FIRSTNME INTO :firstname
        FROM employee
        WHERE LASTNAME = 'JOHNSON';
printf( "First name = %s\n", firstname );
EXEC SQL CONNECT RESET;
return 0;
}
$ db2 connect to sample
$ cc -I /db2/ibm/db2/V9.7/include/ -L /db2/ibm/db2/V9.7/lib32/ -ldb2 -o myeqal_1 myeqal_1.c
$ ./myeqal_1
First name = SYBIL

```

(十九) 客户端远程连接 DB2 Express-C

按照如上方法安装 DB2 Express-C，并创建默认的 db2inst1 示例，远程连接也必须创建一个示例！运行如下命令连接 192.168.56.10 上的 sample 数据库，并将其映射为本地 sample11 数据库：

```

$ db2 catalog tcpip node ppp remote 192.168.56.10 server 50000 ostype linux
$ db2 catalog db sample as sample11 at node ppp
$ db2 terminate
$ db2 connect to sample11 user db2inst1 using db2inst1

```

/etc/odbcinst.ini 配置如下：

```

[DB2 ODBC Driver]
Description           = ODBC fot DB2
Driver                = /db2/ibm/db2/V9.7/lib32/libdb2.so
FileUsage             = 1
DontDLClose          = 1
TraceFile             = /tmp/db2odbc.log
Trace                 = Yes

```

/etc/odbc.ini 配置如下：

```

[sample11]
Description=Sample Database
Driver=DB2 ODBC Driver

```

unixODBC 测试如下：

```

$ isql -v sample11 db2inst1 db2inst1
+-----+
| Connected! |
|          |
| sql-statement |
| help [tablename] |
| quit      |
|          |
+-----+
SQL> select * from emp

```


EMPNO	FIRSTNAME	MIDINIT	LASTNAME	WORKDEPT	PHONENO	HIREDATE	JOB	EDLEVEL	SEX	BIRTHDATE	SALARY	BONUS	COMM
000010	CHRISTINE	I	HAAS	A00	3978	1995-01-01	PRES	18	F	1963-08-24	152750.00	1000.00	4220.00
000020	MICHAEL	L	THOMPSON	B01	3476	2003-10-10	MANAGER	18	M	1978-02-02	94250.00	800.00	3300.00
000030	SALLY	A	KWAN	C01	4738	2005-04-05	MANAGER	20	F	1971-05-11	98250.00	800.00	3060.00
000050	JOHN	B	GEYER	E01	6789	1979-08-17	MANAGER	16	M	1955-09-15	80175.00	800.00	3214.00
000060	IRVING	F	STERN	D11	6423	2003-09-14	MANAGER	16	M	1975-07-07	72250.00	500.00	2580.00
000070	EVA	D	PULASKI	D21	7831	2005-09-30	MANAGER	16	F	2003-05-26	96170.00	700.00	2893.00
000090	EILEEN	W	HENDERSON	E11	5498	2000-08-15	MANAGER	16	F	1971-05-15	89750.00	600.00	2380.00
000100	THEODORE	Q	SPENSER	E21	0972	2000-06-19	MANAGER	14	M	1980-12-18	86150.00	500.00	2092.00
000110	VINCENZO	G	LUCCHESSI	A00	3490	1988-05-16	SALESREP	19	M	1959-11-05	66500.00	900.00	3720.00
000120	SEAN		O'CONNELL	A00	2167	1993-12-05	CLERK	14	M	1972-10-18	49250.00	600.00	2340.00
000130	DELORES	M	QUINTANA	C01	4578	2001-07-28	ANALYST	16	F	1955-09-15	73800.00	500.00	1904.00
000140	HEATHER	A	NICHOLLS	C01	1793	2006-12-15	ANALYST	18	F	1976-01-19	68420.00	600.00	2274.00
000150	BRUCE		ADAMSON	D11	4510	2002-02-12	DESIGNER	16	M	1977-05-17	55280.00	500.00	2022.00
000160	ELIZABETH	R	PIANKA	D11	3782	2006-10-11	DESIGNER	17	F	1980-04-12	62250.00	400.00	1780.00
000170	MASATOSHI	J	YOSHIMURA	D11	2890	1999-09-15	DESIGNER	16	M	1981-01-05	44680.00	500.00	1974.00
000180	MARILYN	S	SCOUTTEN	D11	1682	2003-07-07	DESIGNER	17	F	1979-02-21	51340.00	500.00	1707.00
000190	JAMES	H	WALKER	D11	2986	2004-07-26	DESIGNER	16	M	1982-06-25	50450.00	400.00	1636.00
000200	DAVID		BROWN	D11	4501	2002-03-03	DESIGNER	16	M	1971-05-29	57740.00	600.00	2217.00
000210	WILLIAM	T	JONES	D11	0942	1998-04-11	DESIGNER	17	M	2003-02-23	68270.00	400.00	1462.00

000220	JENNIFER	K	LUTZ	D11	0672	1998-08-29	DESIGNER	18
F	1978-03-19	49840.00	600.00	2387.00				
000230	JAMES	J	JEFFERSON	D21	2094	1996-11-21	CLERK	14
M	1980-05-30	42180.00	400.00	1774.00				
000240	SALVATORE	M	MARINO	D21	3780	2004-12-05	CLERK	17
M	2002-03-31	48760.00	600.00	2301.00				
000250	DANIEL	S	SMITH	D21	0961	1999-10-30	CLERK	15
M	1969-11-12	49180.00	400.00	1534.00				
000260	SYBIL	P	JOHNSON	D21	8953	2005-09-11	CLERK	16
F	1976-10-05	47250.00	300.00	1380.00				
000270	MARIA	L	PEREZ	D21	9001	2006-09-30	CLERK	15
F	2003-05-26	37380.00	500.00	2190.00				
000280	ETHEL	R	SCHNEIDER	E11	8997	1997-03-24	OPERATOR	17
F	1976-03-28	36250.00	500.00	2100.00				
000290	JOHN	R	PARKER	E11	4502	2006-05-30	OPERATOR	12
M	1985-07-09	35340.00	300.00	1227.00				
000300	PHILIP	X	SMITH	E11	2095	2002-06-19	OPERATOR	14
M	1976-10-27	37750.00	400.00	1420.00				
000310	MAUDE	F	SETRIGHT	E11	3332	1994-09-12	OPERATOR	12
F	1961-04-21	35900.00	300.00	1272.00				
000320	RAMLAL	V	MEHTA	E21	9990	1995-07-07	FIELDREP	16
M	1962-08-11	39950.00	400.00	1596.00				
000330	WING		LEE	E21	2103	2006-02-23	FIELDREP	14
M	1971-07-18	45370.00	500.00	2030.00				
000340	JASON	R	GOUNOT	E21	5698	1977-05-05	FIELDREP	16
M	1956-05-17	43840.00	500.00	1907.00				
200010	DIAN	J	HEMMINGER	A00	3978	1995-01-01	SALESREP	18
F	1973-08-14	46500.00	1000.00	4220.00				
200120	GREG		ORLANDO	A00	2167	2002-05-05	CLERK	14
M	1972-10-18	39250.00	600.00	2340.00				
200140	KIM	N	NATZ	C01	1793	2006-12-15	ANALYST	18
F	1976-01-19	68420.00	600.00	2274.00				
200170	KIYOSHI		YAMAMOTO	D11	2890	2005-09-15	DESIGNER	16
M	1981-01-05	64680.00	500.00	1974.00				
200220	REBA	K	JOHN	D11	0672	2005-08-29	DESIGNER	18
F	1978-03-19	69840.00	600.00	2387.00				
200240	ROBERT	M	MONTEVERDE	D21	3780	2004-12-05	CLERK	17
M	1984-03-31	37760.00	600.00	2301.00				
200280	EILEEN	R	SCHWARTZ	E11	8997	1997-03-24	OPERATOR	17
F	1966-03-28	46250.00	500.00	2100.00				
200310	MICHELLE	F	SPRINGER	E11	3332	1994-09-12	OPERATOR	12
F	1961-04-21	35900.00	300.00	1272.00				
200330	HELENA		WONG	E21	2103	2006-02-23	FIELDREP	14
F	1971-07-18	35370.00	500.00	2030.00				

200340	ROY	R	ALONZO	E21	5698	1997-07-05	FIELDREP	16
M	1956-05-17	31840.00	500.00	1907.00				
+-----+-----+-----+-----+-----+-----+-----+-----+-----+								
-----+-----+-----+-----+-----+-----+-----+-----+-----+								

SQLRowCount returns -1
42 rows fetched

ODBC 测试代码如下:

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#include "sql.h"
#include "sqlext.h"

int main (void)
{
    SQLHENV henv;
    SQLHDBC hdbc;
    SQLHSTMT hstmt;
    SQLINTEGER len;
    SQLCHAR szName[50];
    SQLRETURN rtn;
    SQLAllocHandle (SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv);
    SQLSetEnvAttr (henv, SQL_ATTR_ODBC_VERSION, (SQLPOINTER) SQL_OV_ODBC3,
SQL_IS_INTEGER);
    SQLAllocHandle (SQL_HANDLE_DBC, henv, &hdbc);
    if ((rtn = SQLConnect(hdbc, (SQLCHAR *) "sample11", SQL_NTS, (SQLCHAR *) "db2inst1",
SQL_NTS, (SQLCHAR *) "db2inst1", SQL_NTS)) == SQL_ERROR) {
        printf ("SQLConnect Error !\n");
        return 1;
    }
    SQLAllocHandle (SQL_HANDLE_STMT, hdbc, &hstmt);
    if ((rtn = SQLExecDirect (hstmt, (SQLCHAR *) "SELECT FIRSTNME FROM EMP", SQL_NTS)) ==
SQL_ERROR) {
        printf ("SQLExecDirect Error !\n");
        return 0;
    }
    while (SQL_NO_DATA != SQLFetch (hstmt)){
        SQLGetData (hstmt, 1, SQL_C_CHAR, szName, 50, &len);
        printf ("%s\n", szName);
    }
    return 0;
}
```

```
$ cc -o a1 -L /db2/ibm/db2/V9.7/lib32/ -ldb2 a1.c
```

```
$ ./a1
```

CHRISTINE

MICHAEL

SALLY

JOHN

IRVING

EVA

EILEEN

THEODORE

VINCENZO

SEAN

DELORES

HEATHER

BRUCE

ELIZABETH

MASATOSHI

MARILYN

JAMES

DAVID

WILLIAM

JENNIFER

JAMES

SALVATORE

DANIEL

SYBIL

MARIA

ETHEL

JOHN

PHILIP

MAUDE

RAMLAL

WING

JASON

DIAN

GREG

KIM

KIYOSHI

REBA

ROBERT

EILEEN

MICHELLE

HELENA

ROY

ESQL 测试如下:

```
/* myeqal_1.sqc */
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#include "sqlca.h"

EXEC SQL INCLUDE SQLCA;

int main(void)
{
    EXEC SQL BEGIN DECLARE SECTION;
    char firstname[13];
    char userid[9];
    char passwd[19];
    EXEC SQL END DECLARE SECTION;
    EXEC SQL CONNECT TO sample11 user db2inst1 using db2inst1;
    EXEC SQL SELECT FIRSTNME INTO :firstname
        FROM employee
        WHERE LASTNAME = 'JOHNSON';
    printf( "First name = %s\n", firstname );
    EXEC SQL CONNECT RESET;
    return 0;
}

$ db2 prep myeqal_1.sqc
$ cc -I /db2/ibm/db2/V9.7/include/ -L /db2/ibm/db2/V9.7/lib32/ -ldb2 -o myeqal_1 myeqal_1.c
$ ./myeqal_1
First name = SYBIL
```