MINISTRY OF EDUCATION AND SCIENCE OF REPUBLIC OF KAZAKHSTAN
SULEYMAN DEMIREL UNIVERSITY
ENGINEERING FACULTY

Department of Computer Engineering

UDC 004.65

Seisenbay Assem

OPERATION OF ORACLE SOFTWARE ON THE OPERATING SYSTEM WINDOWS

6M070400– «Computing systems and software» speciality

Kaskelen, 2013

MINISTRY OF EDUCATION AND SCIENCE OF REPUBLIC OF KAZAKHSTAN
SULEYMAN DEMIREL UNIVERSITY
ENGINEERING FACULTY

SULEYMAN DEMIREL
UNIVERSITY

Department of Computer Engineering

«Accepted for defense»
responsible director of department
d.t.s professor Amirgaliyev E. N.
_____
«__» _____ 2013 year

Director of department
for postgraduate education
Ph.s.c. Aydogdu Sh.
«__» _____ 2013 year

Master dissertation

INSTALLATION OF ORACLE SOFTWARE ON THE OPERATING SYSTEM WINDOWS

6M070400– «Computing systems and software» speciality

Master student _____ Seisenbay Assem
(signature)

Supervisor
_____ d.t.s., professor Niyazi Ari
(signature)

Kaskelen, 2013

CONTENTS

ABSTRACT

Oracle is the world's largest enterprise software company, offering solutions for middleware, business intelligence, business applications, and collaboration. Oracle offers information solutions for businesses: how to manage information, ways to use it, solutions for sharing it, how to protect it. Also it is known in the technology industry as being very innovative and highly competitive software. Well, thanks to Oracle databases, most banks are able to manage our critical information securely and flawlessly. Oracle databases are all about robustness, power and exceptional data maintaining capabilities. You hardly hear about an Oracle database crashing or messing up with the data.

Operating system Windows by nowadays statistics (http://gs.statcounter.com/#os-ww-monthly-201202-201302 , http://www.netmarketshare.com/report.aspx?qprid=11&qpcustomb=0) we can understood, that it is more useful and popular. So, in this work I will try explain you main key points in installing Oracle software on windows operating system.

This work contains tutorials which briefly show and tell how to install software and to securely manage it by telling simple "selects". Which is enough to know for the first time to specialists working with database without critical errors. Also by doing these tutorials you will understand how the Database structure on oracle is organized.

Here the main points to setup Database are mentioned simply and makes you to gain your goal in a short time without reading lots of information. And also here the common mistakes while administrating Oracle Database are shown. It will be helpful for beginner users who want to get their feet wet with Oracle Database.

АБСТРАКТ

Oracle это крупнейшее предприятие мирового уровня в сфере программного обеспечения, предлагающая решения для промежуточного ПО, бизнес-аналитики, бизнес-приложений, а также сотрудничество. Oracle предлагает информационные решения для бизнеса: как управлять информацией, способы его использования, решения для обмена им, как защитить его. К тому же в индустрии технологии признано, как очень инновационной и высоко конкурентной программой. Что ж, благодаря базам данных Oracle, многие банки могут управлять нашими личными информациями, сохраняя секретность и сохранность. Базы данных Oracle нужны для надежности, мощности и за их исключительные свойства поддержки данных. Вы почти нигде не услышите о крахе баз данных или смешивании информации с Oracle.

Операционная система Windows по нынешней статистике (http://gs.statcounter.com/#os-ww-monthly-201202-201302 , http://www.netmarketshare.com/report.aspx?qprid=11&qpcustomb=0) мы можем понять что он является самым популярным и используемым. Следовательно, в этой работе я постараюсь объяснить основные моменты в инсталляции программного продукта Oracle на операционной системе Windows.

Это работа содержит руководство, которое детально показывает и объясняет, как установить продукт и управлять им, написав простые запросы. Этого будет достаточно для специалиста, который только начал работать, чтобы справиться с задачами без критических ошибок. К тому же, используя это руководство вы поймете как структура баз данных работает в Oracle.

Здесь основные моменты для установки баз данных указаны и это поможет вам в короткий срок достичь своей цели без освоения большой информации. Еще в работе были указаны основные встречающиеся ошибки при администрировании баз данных Oracle. Это поможет для начинающих пользователей найти общий язык с базой данных Oracle.

ТҮЙІН

Oracle бұл бағдарламалық қамтама аланындағы әлемдік деңгейдегі компания, аралық бағдарламаларға арналған шешімдер, бизнес-сараптау, бизнес-бағдарламаларын, оған қоса әріптестікті ұсынатын компания. Oracle бизнесқа арналған ақпараттық шешімдерді ұсынады: ақпаратты қалай басқару керек, оны қолдану тәсілдері, онымен алмасу үшін шешімдер, қалай қорғау т.с.с.. Оған қоса технология индустриясында ең инновациялық және жоғарғы деңгейдегі бәсекелес деп қабылданады. Oracle декрекқорының көмегімен көптеген банкілер біздің жеке ақпараттарымызды құпиялығын және бүтіндігін сақтап, басқара алуда. Oracle дерекқорлары сенімділік, қуаттылық және ақпаратты қамтитын ерекшеліктері үшін қажет. Oracle –мен бірге сіздер декрекқордың жойылғандығын немесе деректердің ауысып кеткендігін мүлдем ешқайда естімейсіздер.

Windows операциялық жүйесі қазіргі заманның статистикасы бойынша (http://gs.statcounter.com/#os-ww-monthly-201202-201302 , http://www.netmarketshare.com/report.aspx?qprid=11&qpcustomb=0) ең танымал және көп қолданылатындығын түсіне аламыз. Сондықтан, бұл жұмыста мен Oracle бағдарламалық қамтамасын Windows операциялық жүйесінде орнатудың негізгі қадамдарын түсіндіруге тырысамын.

Бұл жұмыста бағдарламаны қалай орнату керек және онымен басқарудың толық нұсқаулықтары қарапайым нұсқамалар жазу арқылы көрсетілген және түсіндірілген. Бұл жаңадан жұмысқа кіріскен маман үшін берілген тапсырмаларды аса үлкен қателерді жіберместен орындау үшін жеткілікті болады. Оған қоса, бұл нұсқаулықты қолдану арқылы сіз Oracle дерекқорының құрылымы қалай жұмыс істейтіндігін түсіне аласыз.

.....Мұнда дерекқорды орнатудың негізгі қадамдары көрсетілген және бұл сізге қысқа уақытта өз мүддеңізге көп ақпаратқа ие болмай-ақ жету үшін көмектеседі. Жұмыста әрі Oracle дерекқорын басқарудағы көп кездесетін қателер көрсетілген. Бұл Oracle дерекқорында жұмысты енді бастағандарға ортақ тіл табу үшін тиімді болады.

DEFINITIONS

1. **EM**- Enterprise manager

2. **DB**- Database

3. **DBA**-Database Administrator

4. **PMON** - is an Oracle background process created when you start a database instance. The PMON process will free up resources if a user process fails (eg. release database locks). PMON normally wakes up every 3 seconds to perform its housekeeping activities. PMON must always be running for an instance. If not, the instance will terminate. [22]

5. **SMON** - is an Oracle background process created when you start a database instance. The SMON process performs instance recovery, cleans up after dirty shutdowns and coalesces adjacent free extents into larger free extents.[22]

6. **DBWR** - is an Oracle background process created when you start a database instance. The DBWR writes data from the SGA to the Oracle database files. When the SGA data buffer cache fills the DBWR process selects buffers using an LRU algorithm and writes them to disk.[22]

7. **LGWR** – (LoG WRiter) is an Oracle background process created when you start a database instance. The LGWR writes the redo log buffers to the on-line redo log files. If the on-line redo log files are mirrored, all the members of the group will be written out simultaneously.[22]

8. **SGA** - The SGA (System Global Area) is an area of memory (RAM) allocated when an Oracle Instance starts up. The SGA's size and function are controlled by initialization (INIT.ORA or SPFILE) parameters.[22]

9. **SYS** – default system user which is in group SYSDBA

10. **SYSDBA** – System Database Administrator group

11. **OTN**- Oracle Technology Network[3]

12. **MetaLink** - Metalink is a service provided by Oracle to customers who want any sort of technical assistance.[23]

13. **ORACLE_BASE** - is the top directory where all Oracle files on the machine are going to exist. If you have multiple versions of Oracle on the same machine, the ORACLE_BASE is likely the same.[1]

14. **ORACLE_HOME** - is where you have Oracle installed. Not only that, but it tellsyour session which Oracle installation you want to use.[1]

15. **ORACLE_SID** - is simply set to the name of the database that you want to connect to. If the database doesn't exist, set it to the name of the database you're about to create.[1]

16. **PATH**- The variable is typically already set for all sessions on the system. However, when you're using Oracle, you have to add to the path. You simply have to remember to put ORACLE_HOME/bin in front of your path.[1]

1. INTRODUCTION

The Oracle 11g database can support any requirement you have for using and storing data. From financial institutions, such as banks, to human resources or manufacturing applications, Oracle can handle it. Its strengths lie in its vast number of software components and its ability to recover to any point in time.

Oracle has many advantages and features that makes it popular and thereby makes it as the world's largest enterprise software company. Oracle comes with new versions with new features implemented in new version while the features of earlier versions still being maintained. One important aspect is Oracle databases tend to be backwards compatible. Also when Oracle releases a new version, their documentation contains a list of all the features new to that version thus makes it user friendly for one to learn the new features.

Well, thanks to Oracle databases, most banks are able to manage our critical information securely and flawlessly. Oracle databases are all about robustness, power and exceptional data maintaining capabilities. You hardly hear about an Oracle database crashing or messing up with the data!

While security and reliability are, definitely, a big 'yes' for Oracle databases, the complexity involved with programming and deployment are definitely a 'fear factor'. Therefore, you typically find Oracle installed in large corporations. It fails to find friends in small or medium enterprises.

Therefore, in this my work, I tried to simplify as more as I can so huge program which is for every part could written a book. I tried to focus things you shouldn't overlook when installing, managing and working on Oracle. I tried to write every tutorial consequentially, so you can try in series as you can use seperately each tutorial.

2. Install Oracle on your Windows Machine

2.1. Step 1: Creating a OTN Account

To download you first have to register to Oracle Website and steps are given below how it is mentioned.

To create your own Oracle Technology Network (OTN) account.
Go to www.oracle.com you will see this screen and click there to register for oracle account

Figure 2.1.1. Main Oracle site where to register.

2.2. Step 2: Downloading Oracle 11g

After registration you see screen below in Figure 2., there in part DOWNLOADS click to Oracle Database.

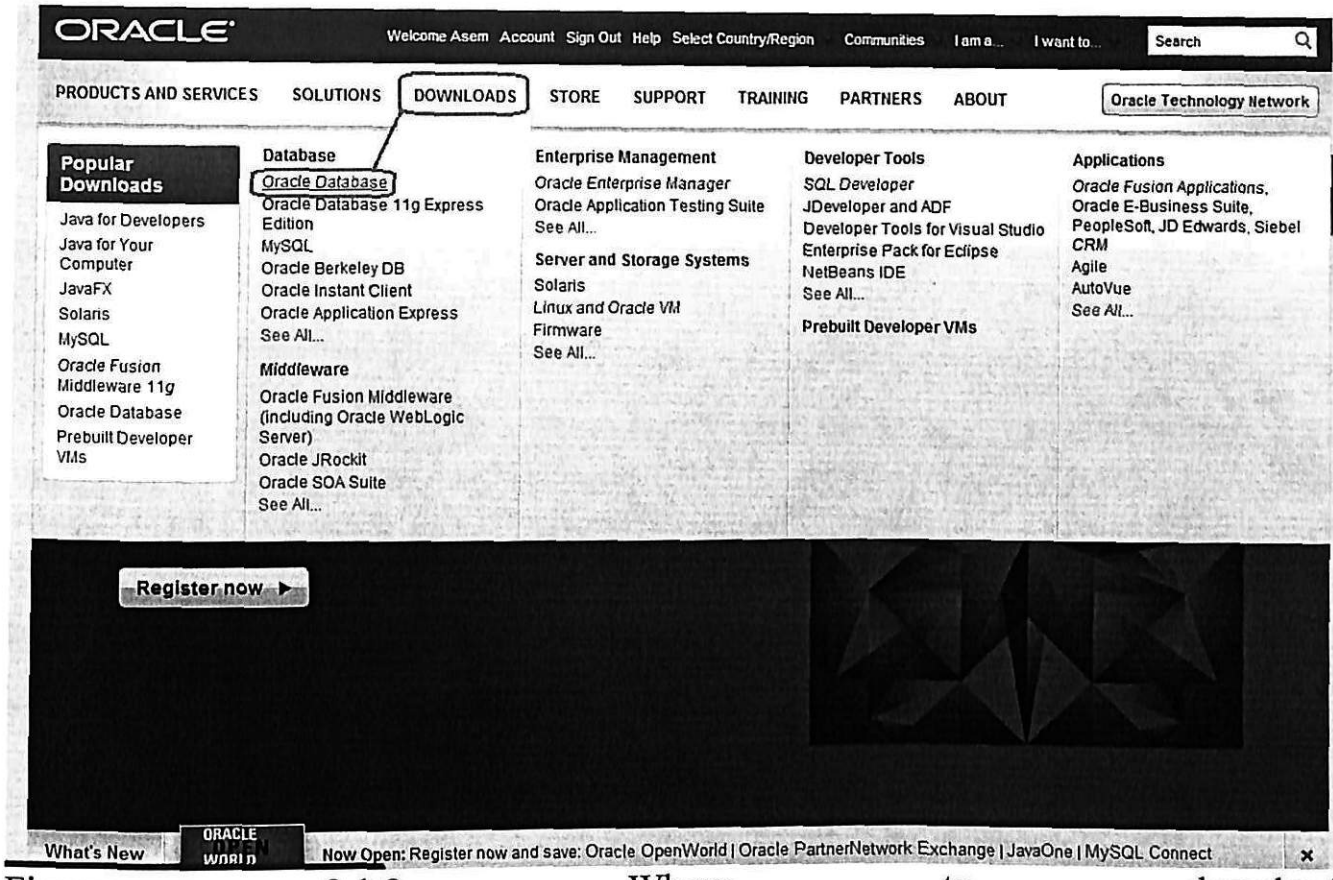


Figure 2.1.2. Where to download.

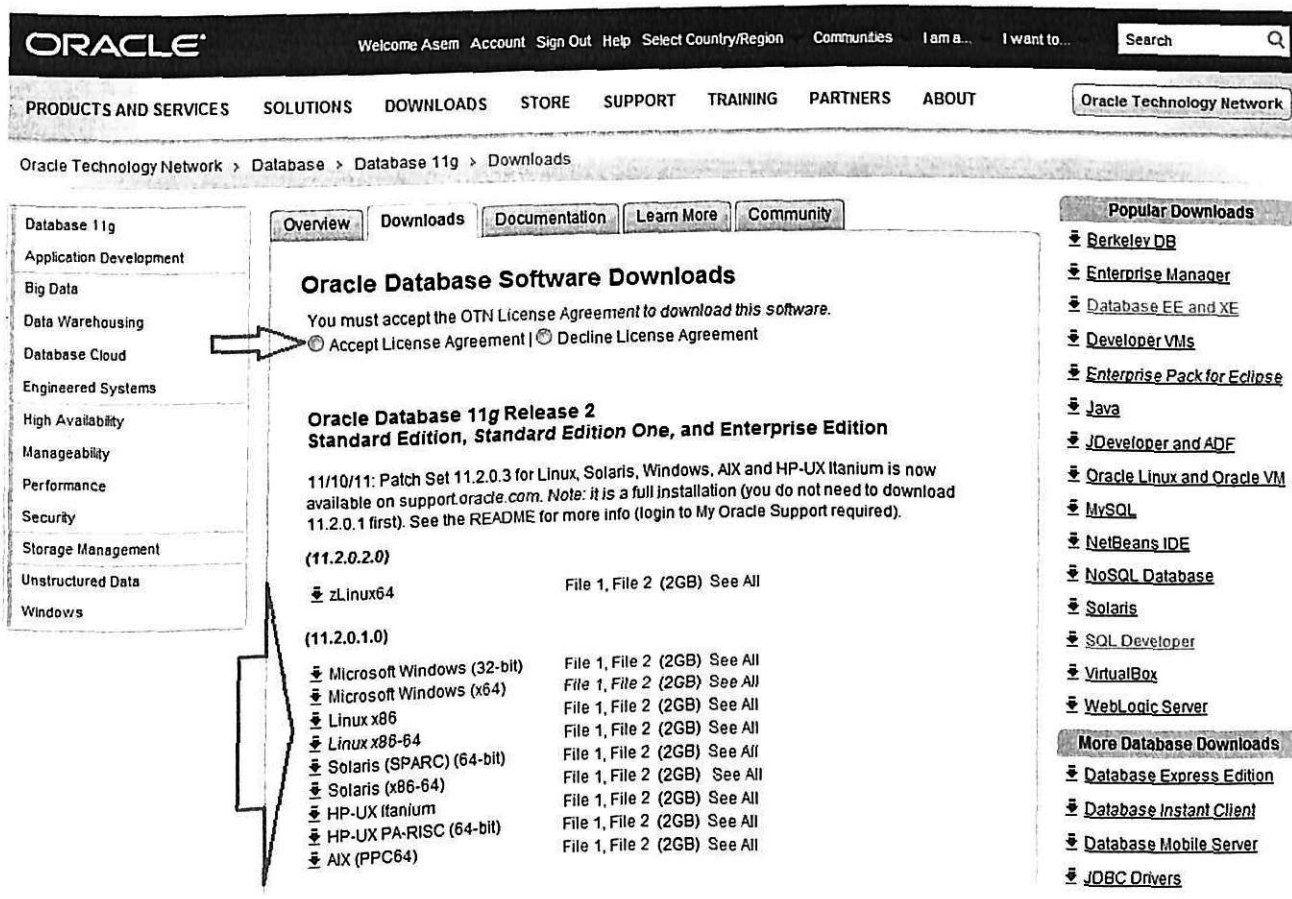


Figure 2.1.3.
In above Figure 2.1.3. you can see Oracle Database Downloads. You can download the required version according to your Platform by accepting the license agreement.

After Step 1 select the required version according to your platform (I will test on OS Windows 7, 32 bit) and save the Database files to same way on your disk.

2.3. *Step 3: Unzipping Oracle*

And after saving both the files on your disk, we have to UNZIP the files. After unzipping each one copy files from win32_11gR2_database_2of2\database\stage\Components to win32_11gR2_database_1of2\database\stage\Components.

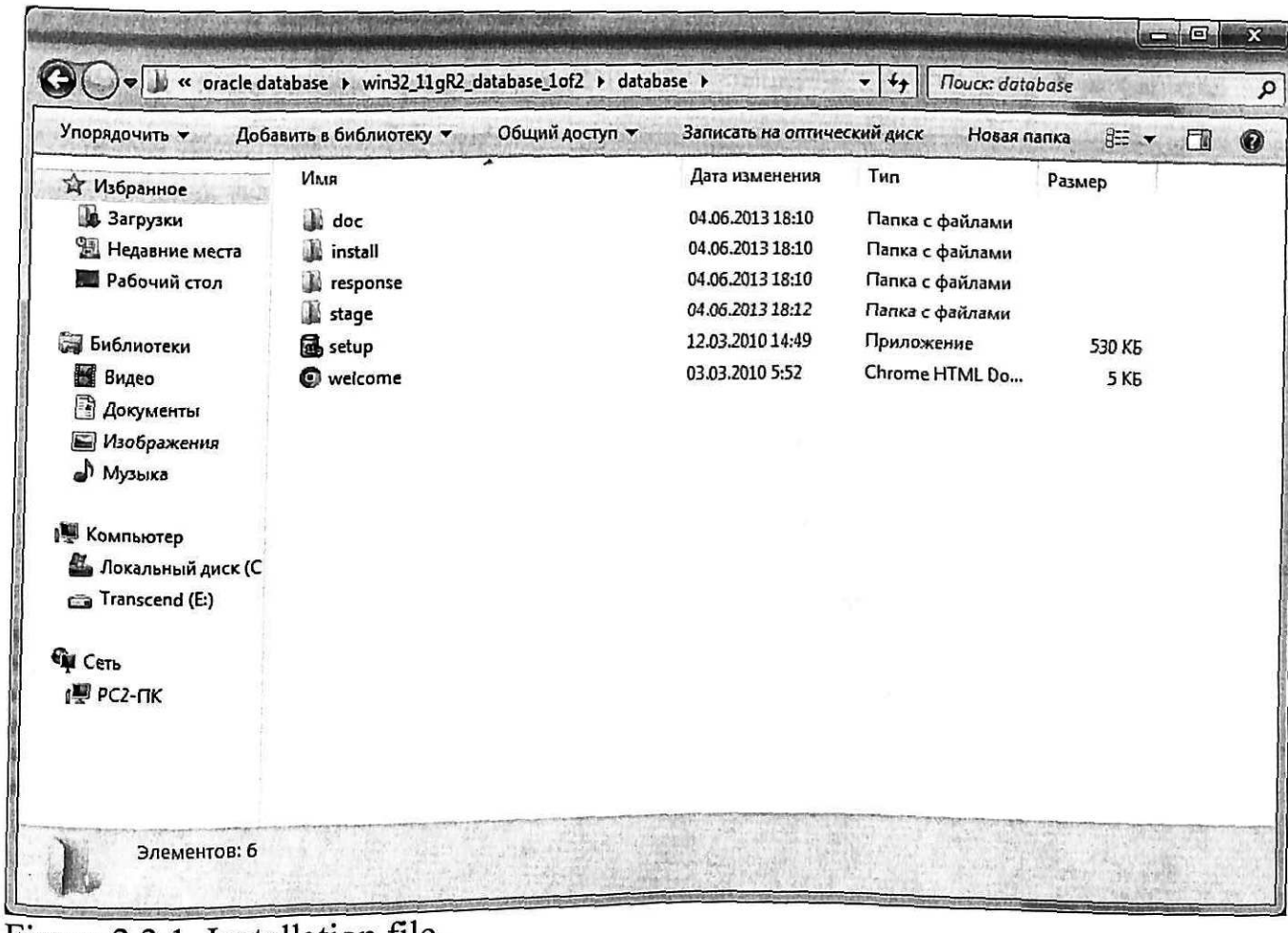


Figure 2.3.1. Installation file.
Click Here on Setup Files to Start Installing Oracle on your system.

2.4. *Step 4: Installing and Configuring Oracle*

1. Click on the setup icon to launch the installer.

2. In Figure 2.4.1., you're prompted for your Email and MetaLink Password. If this is a test database (a throw away instance without any real data), you can uncheck the box for automatic security updates. You should enter a password even for test databases. Click the Next button to proceed.

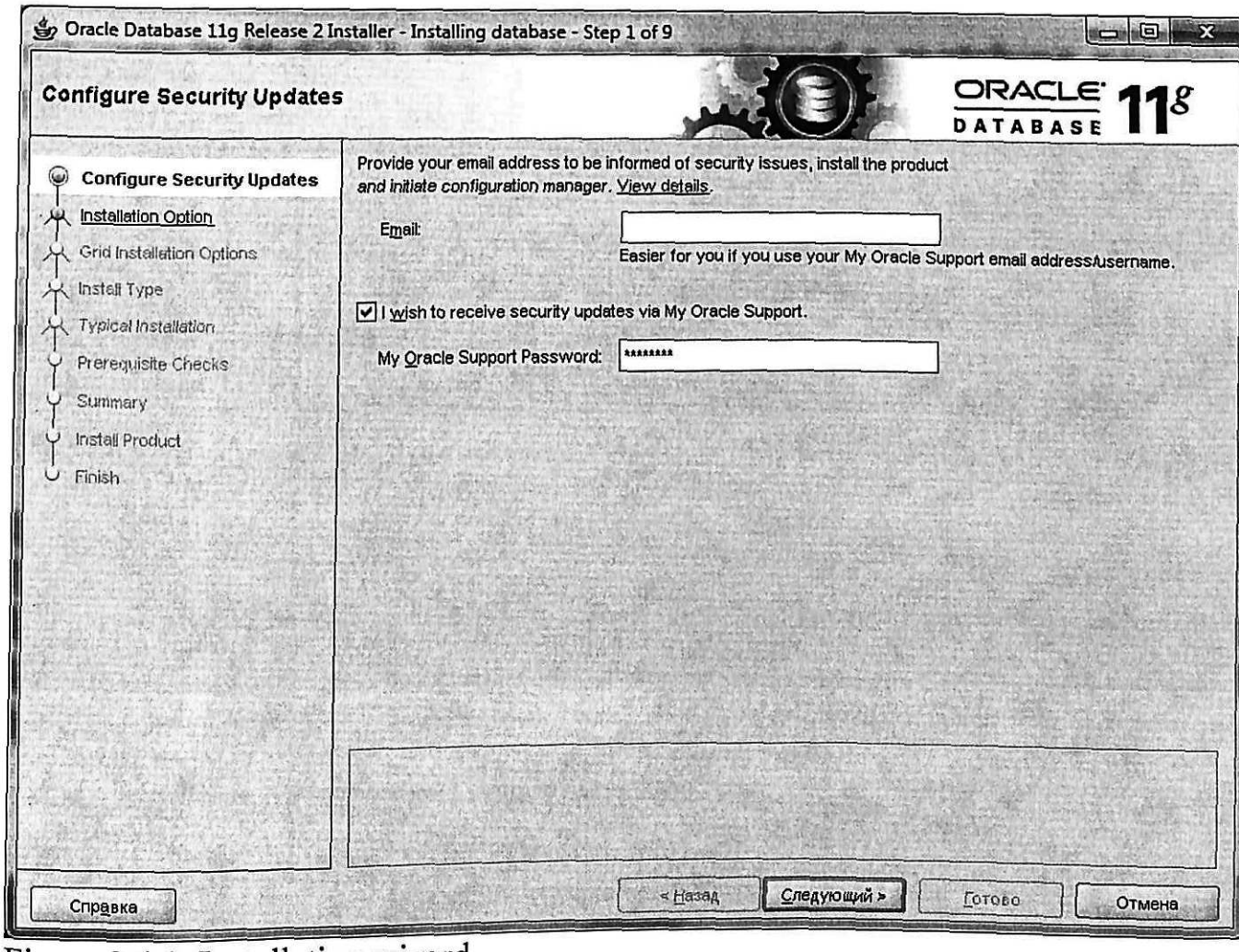


Figure 2.4.1. Installation wizard.

3. Select Create and configure a database.

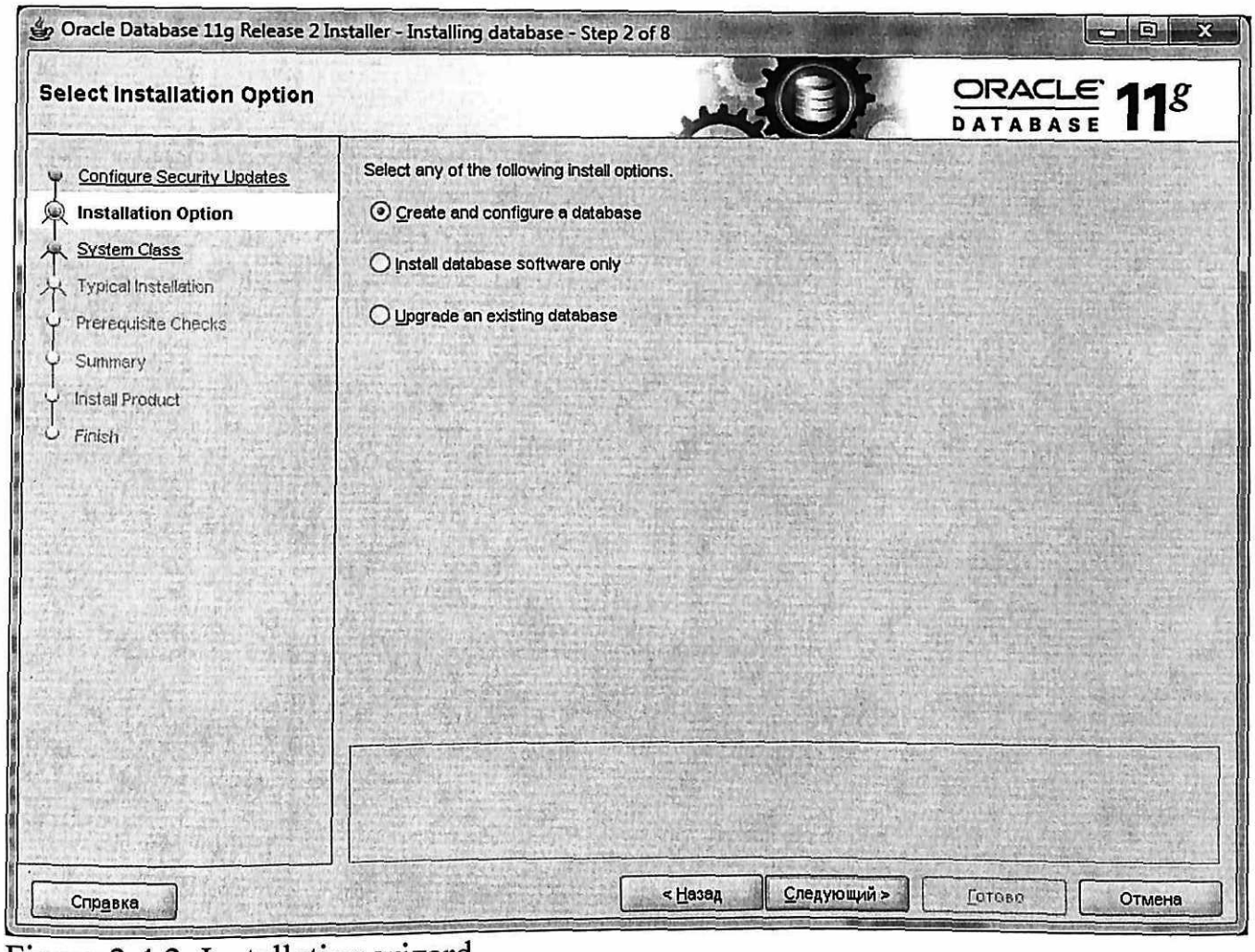


Figure 2.4.2. Installation wizard.

4. I am installing on laptop so I select Desktop Class.

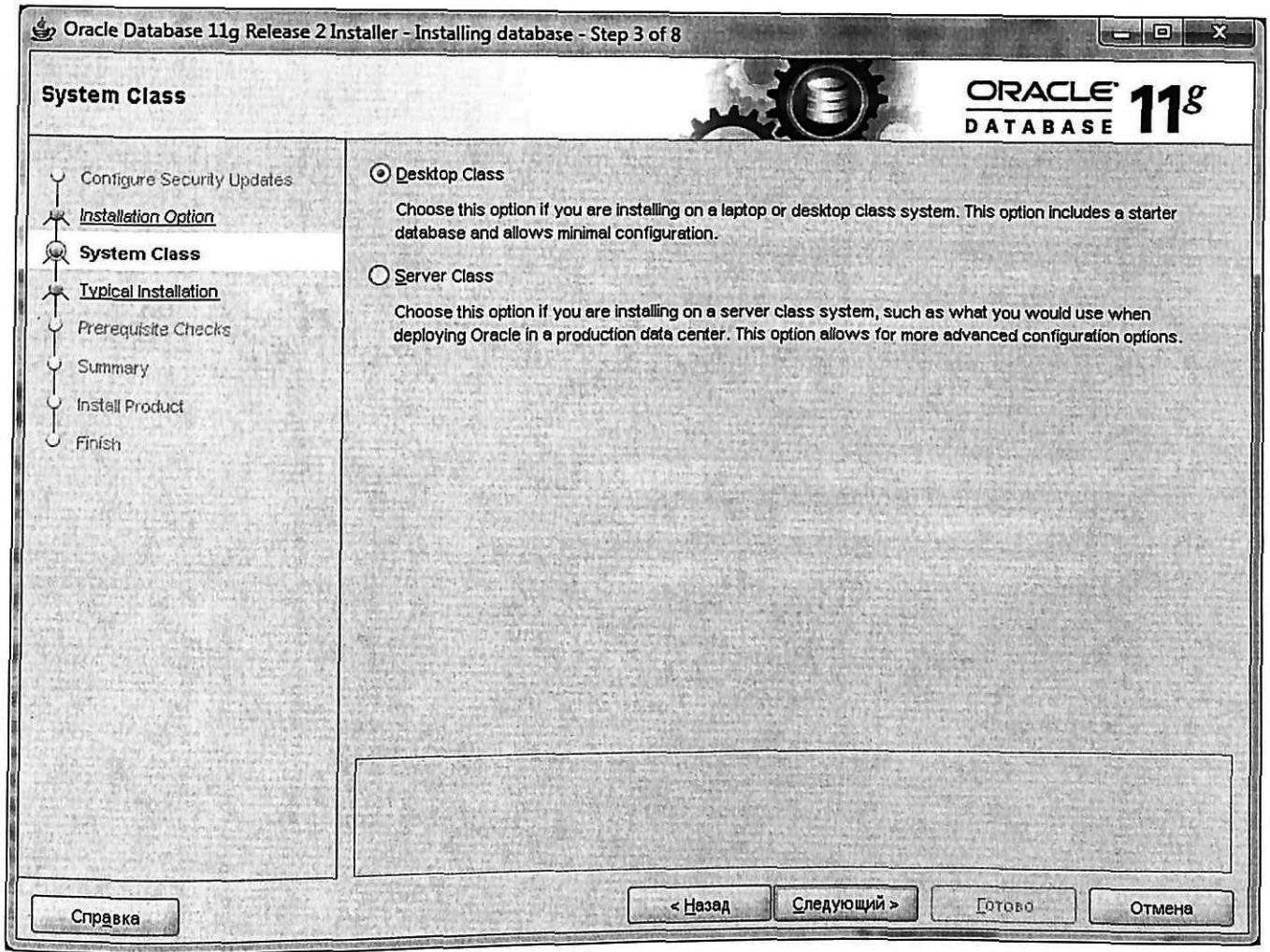


Figure 2.4.3. Installation wizard.

5. I prefer to leave settings by default, and I will change only database name and set a password.

Here Oracle password requirement is: Caps lock, standard lock and at least one number minimum 8 characters maximum 128.

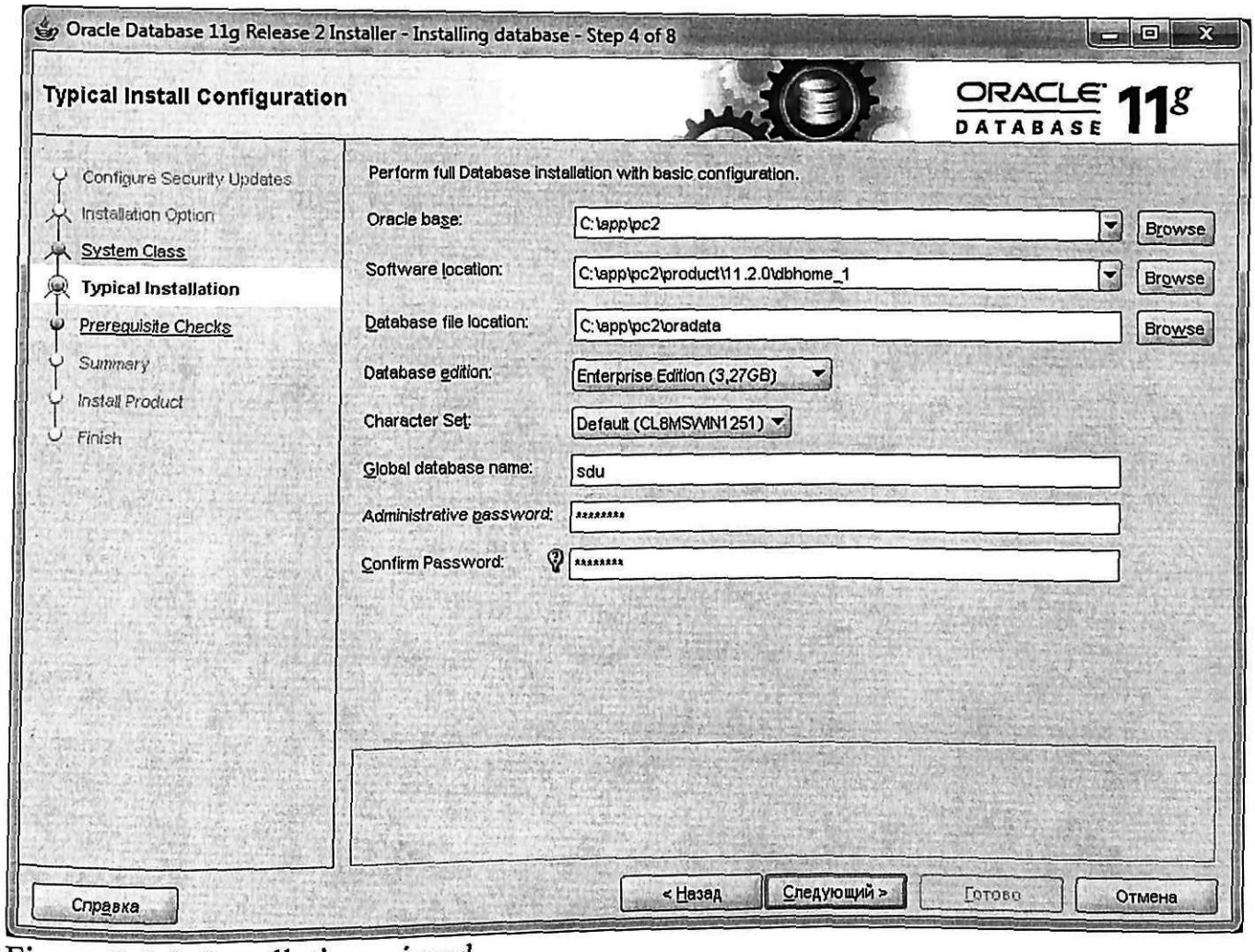


Figure 2.4.4. Installation wizard.

6. Because of my computer parameters not so cool all requirements are failed. I can ignore them than continue it will work very slow and poor.

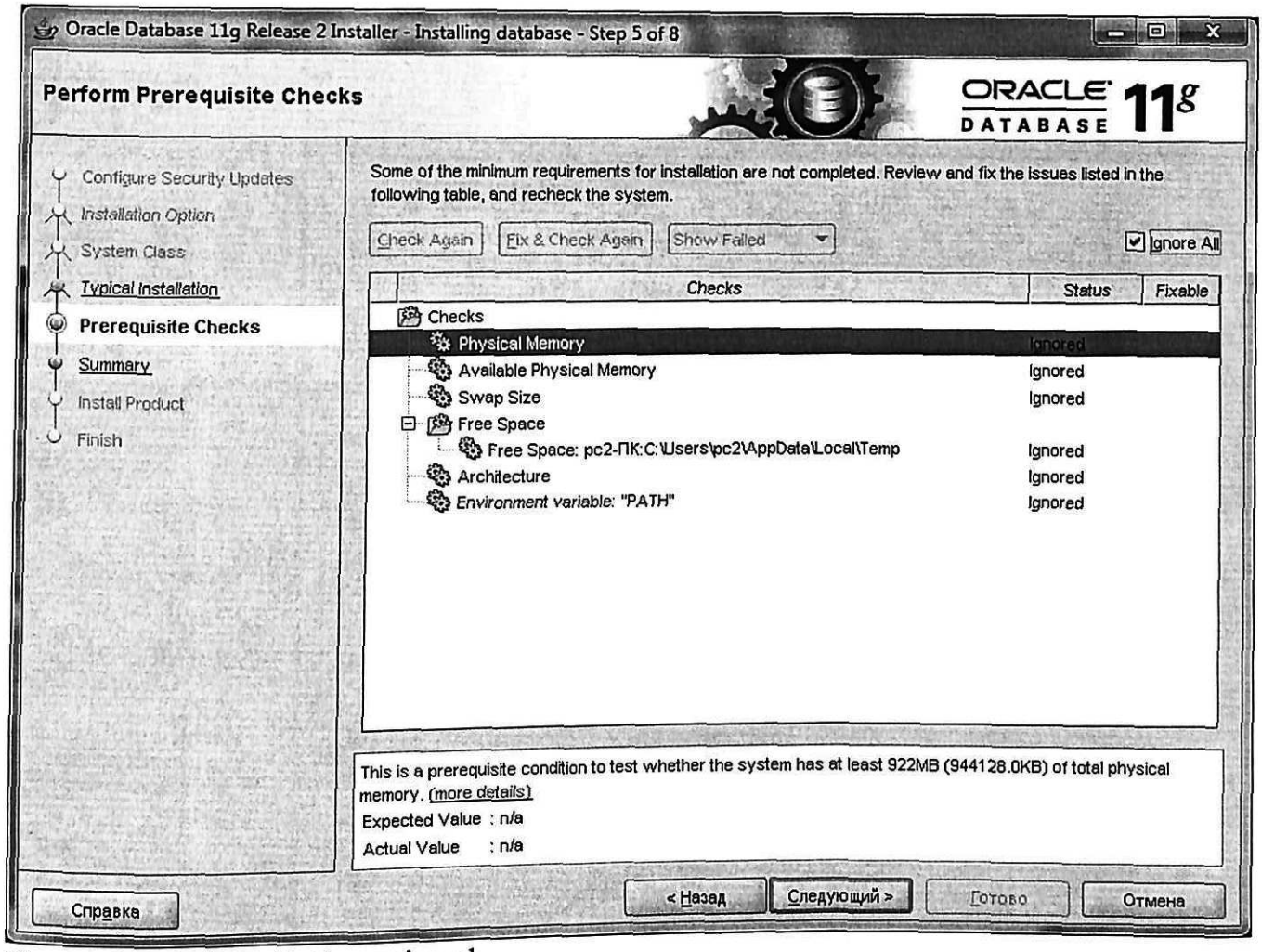


Figure 2.4.5. Installation wizard.

7. At this point, you'll get a Windows System Alert asking you to unblock the installer's javaw.exe program. You must grant the access or forget about installing Oracle 11g. Click the Allow access button to proceed.

8. Than the dialog tells you what will be installed. Click the Install button to proceed.

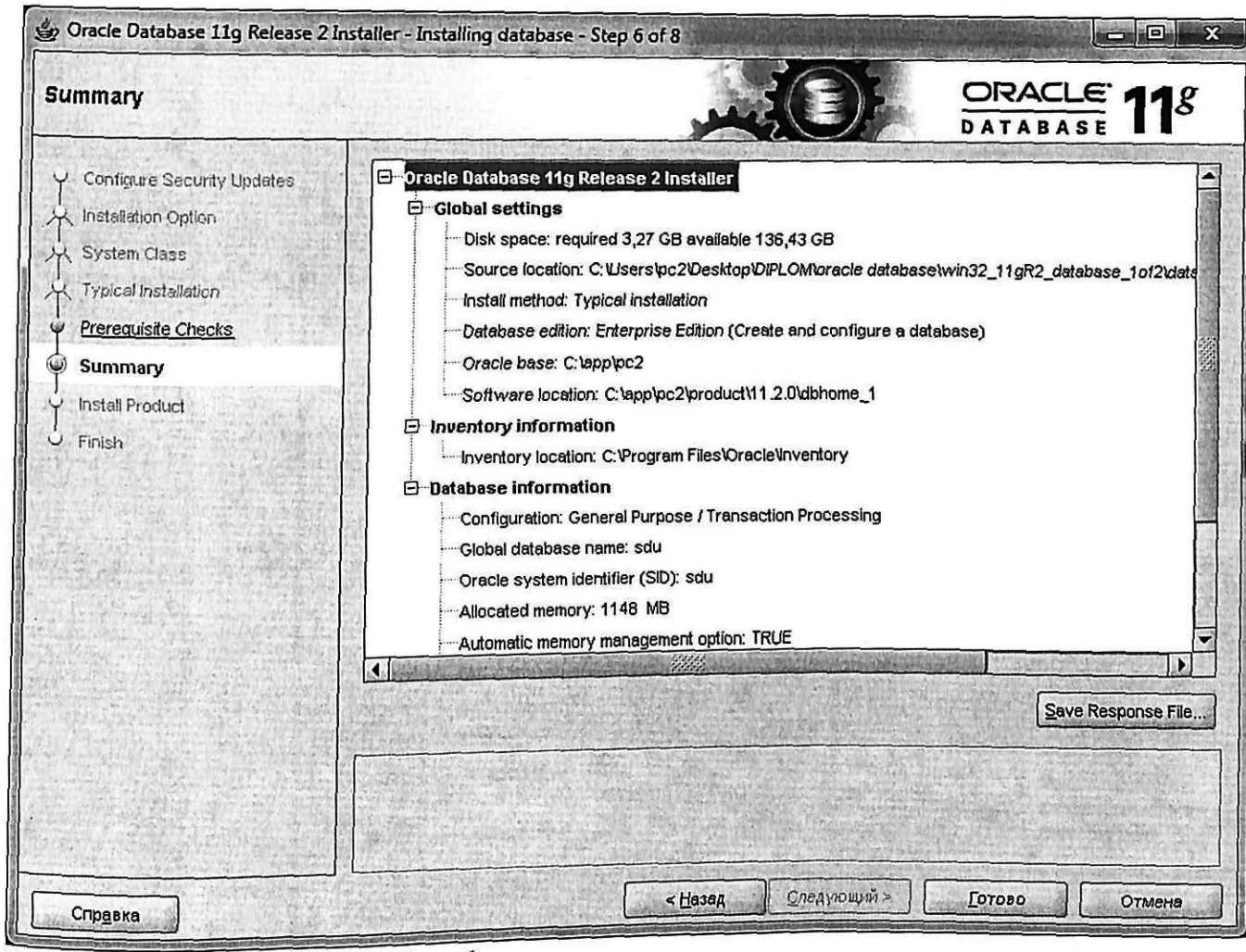


Figure 2.4.6. Installation wizard.

9. This is the installation progress dialog. It's running while the Oracle Installer lays down the operating system files for the database management system. It takes about 8 to 9 minutes, so stretch your legs if you want to take a break. When it's 100% complete, click the Next button to continue.

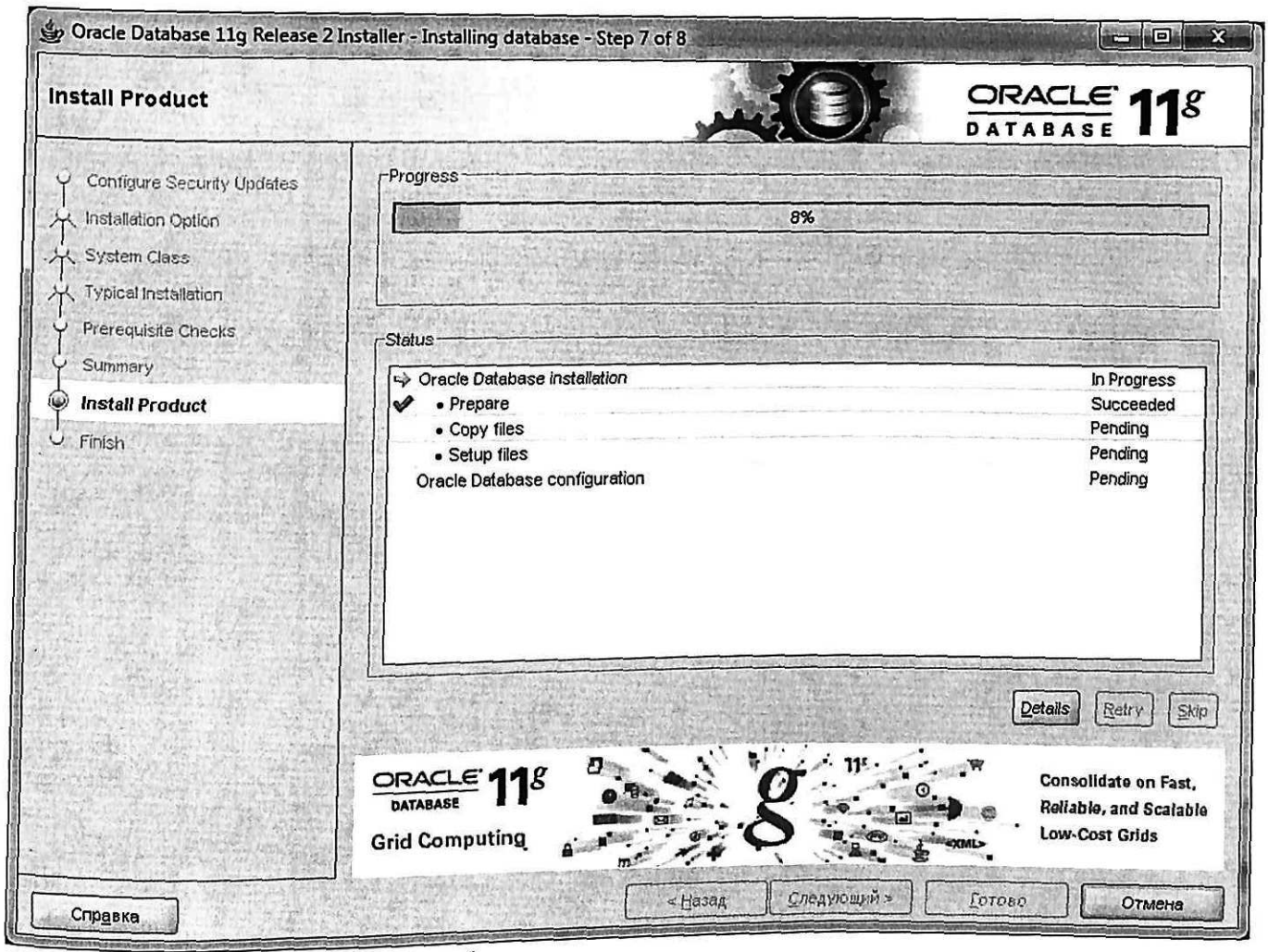


Figure 2.4.7. Installation wizard.

10. Than starts configuration assistants. This one is exactly where it belongs. It means you have approximately a 5 to 6 minute break while a sample database instance is cloned for you. The cloning process copies a sample compressed database from the installation staging area to your local operating system.

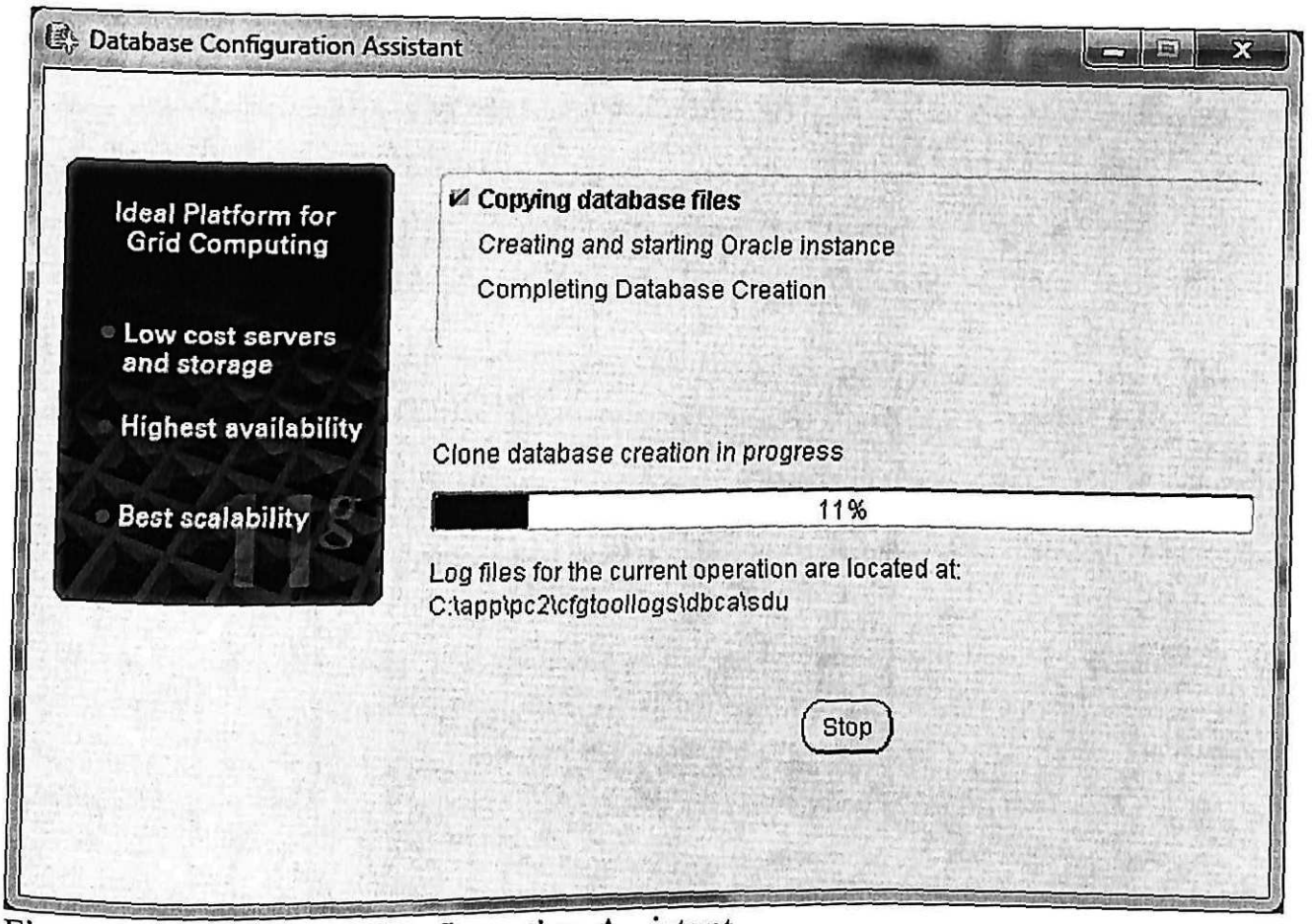


Figure 2.4.8. Database Configuration Assistant.

It will prompt you if you want to open any of the other scheme. You can skip this and do it later, or click Password Management to open those scheme and set passwords for them.

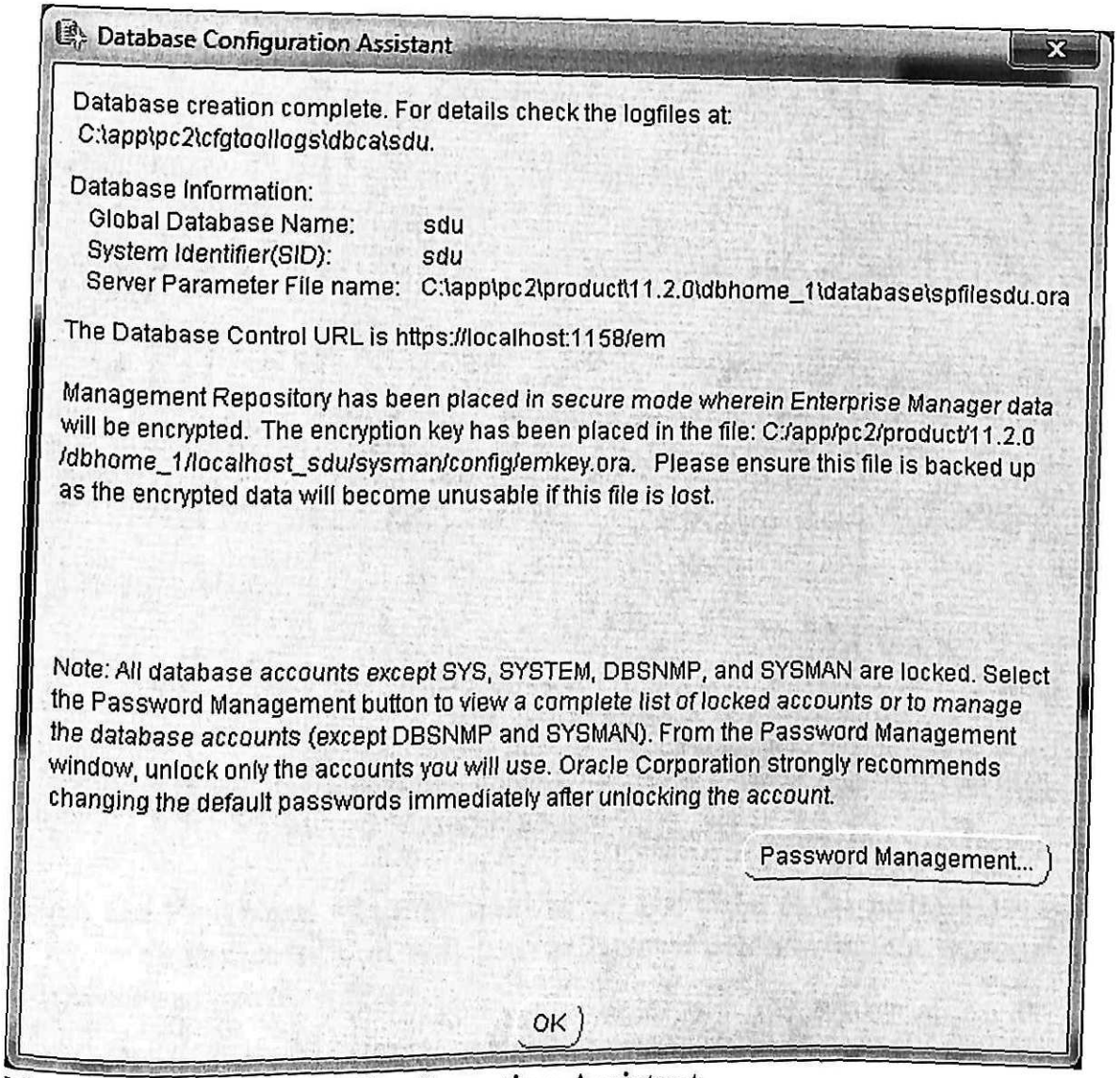


Figure 2.4.9. Database Configuration Assistant.

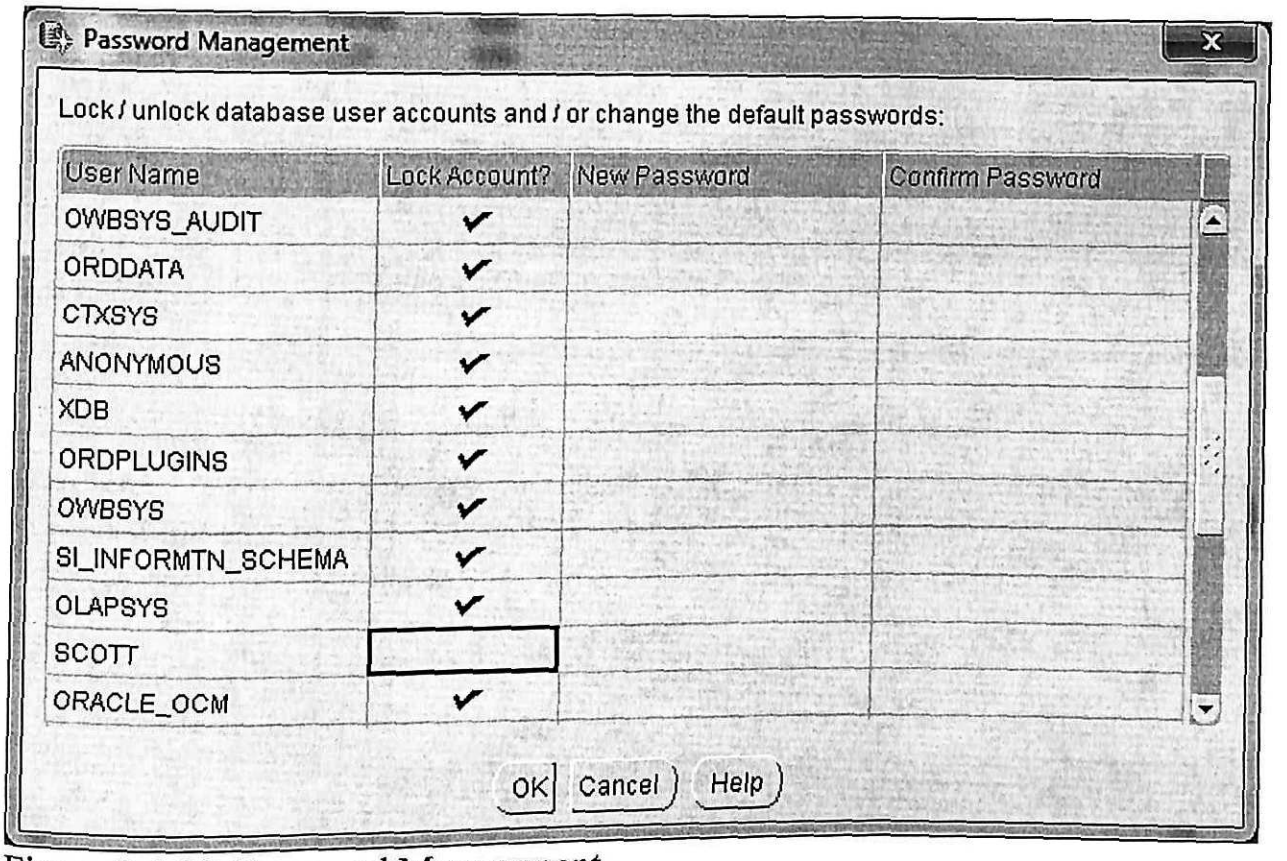


Figure 2.4.10. Password Management.

Click On Password Management to set UP User name and password
User name as **Scott**. You will find in Password Management window, please unlock it and set password as **tiger.**

11. You've finally reached almost the end of the installation. Click the Exit button on this dialog to proceed to the "are you sure" dialog box.

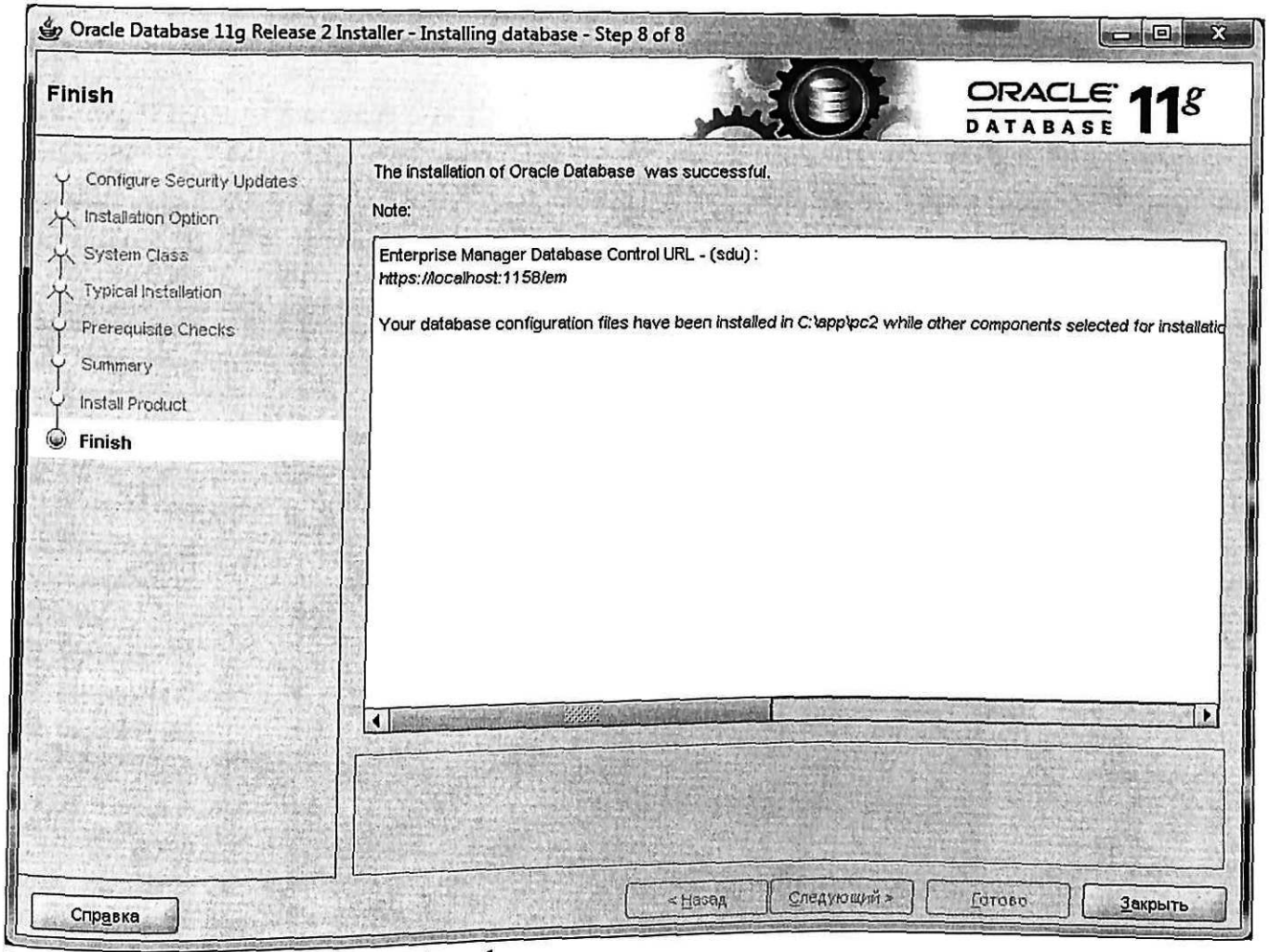


Figure 2.4.11. Installation wizard.

3. Connecting to and Using an Oracle Database

*3.1. Start SQL*Plus as a DBA*

In start we see Oracle - OraDb11g_home1 there you have Application Developme
click to SQL Plus.

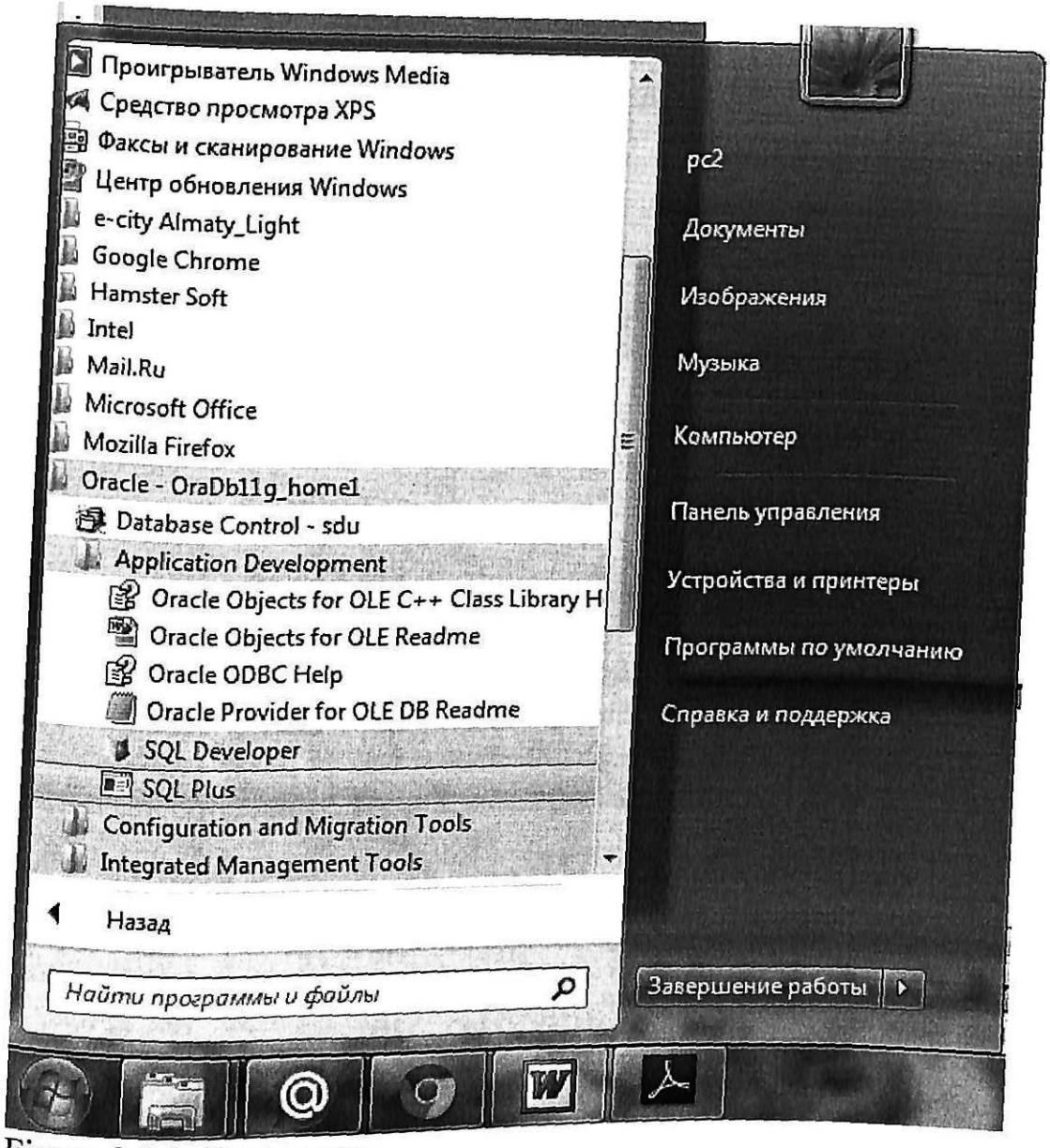


Figure 3.1.1. Start menu.

There appears icon SQL Plus where you have to type "/ as sysdba"

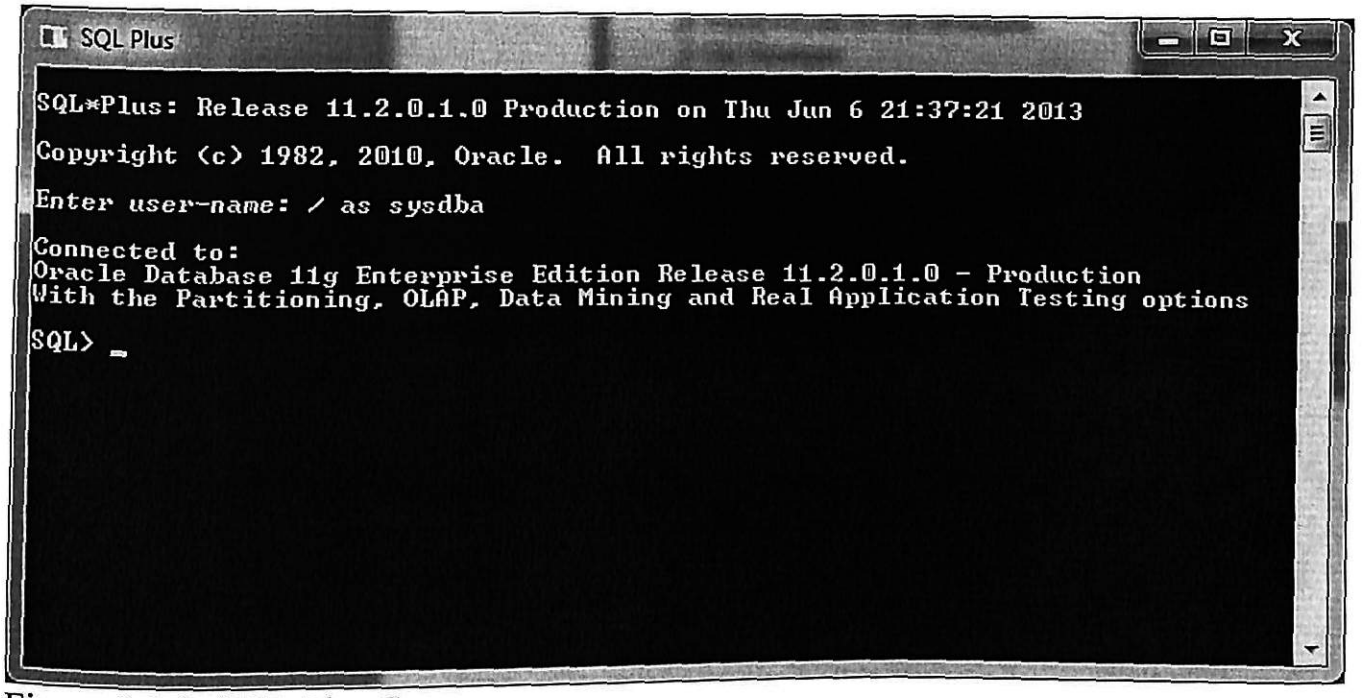


Figure 3.1.2. SQL Plus Screen.
So you are connected successfully

3.2. Starting the database

We don't actually start a database we start the instance.
A database is defined as the actual data, index, redo, temp, and control files that exist on the files system. The instance consists of the processes (PMON, SMON, DBWR, LGWR, and others) and the SGA (memory pool) that access and process data from the database files.[1] The instance is what accesses the database, and it is the instance that users connect to. Thus, it is the instance (not the database) that you actually start.

As an Oracle instance starts, it proceeds through various states until it and the database are fully open and accessible to users. At each state, different components are started and opened. Furthermore, at each state you may perform different types of DBA or user work. You may specify your startup command to take the database instance into a specific state depending on what you need to do.

STARTUP NOMOUNT
✓ Read Parameter File
✓ Allocate SGA
✓ Start Background Processes
✓ Only SGA and Background Processes Running
✓ Used for CREATE DATABASE (Only SYS can access)
✓ Specified by STARTUP NOMOUNT

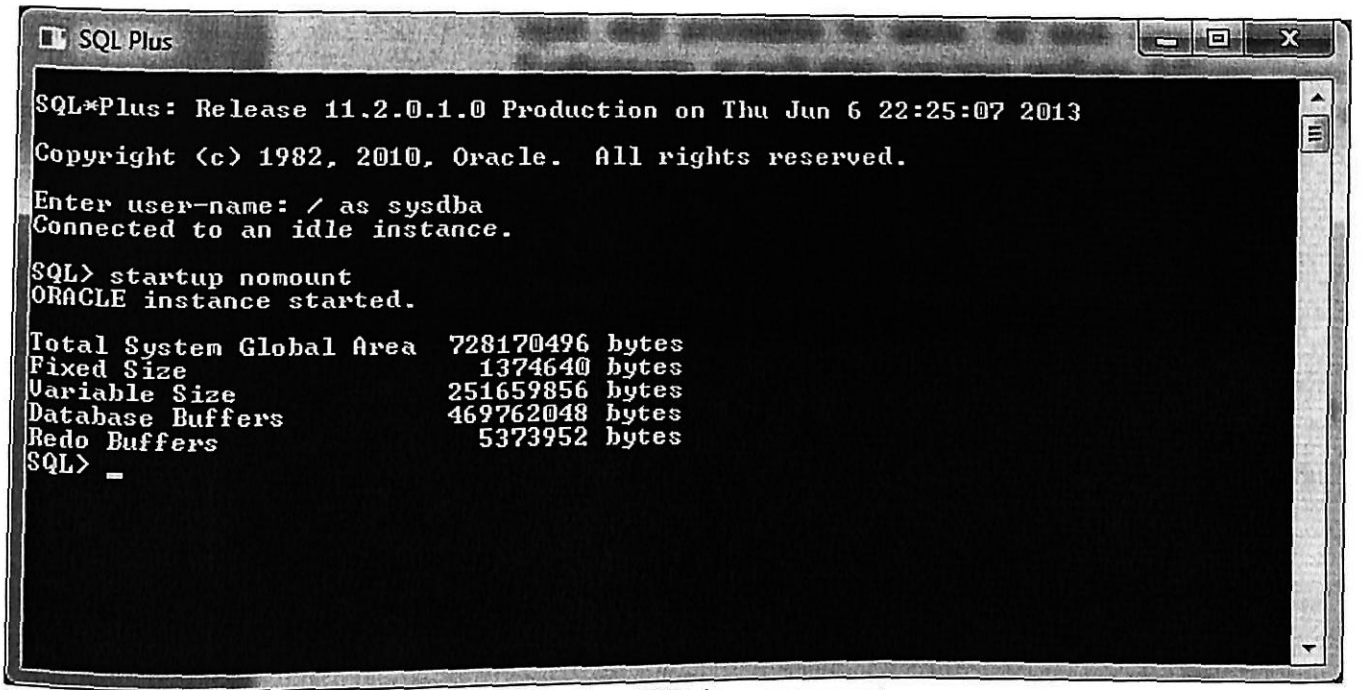


Figure 3.2.1. SQL Plus Screen. Starting DB by nomount.

MOUNT

- ✓ Read Parameter File
- ✓ Allocate SGA
- ✓ Start Background Processes
- ✓ Open and Read Control File
- ✓ SGA and Background Processes Running and Control Files Open
- ✓ Used for database maintenance and recovery operations (Only SYS can access)
- ✓ Specified by STARTUP MOUNT

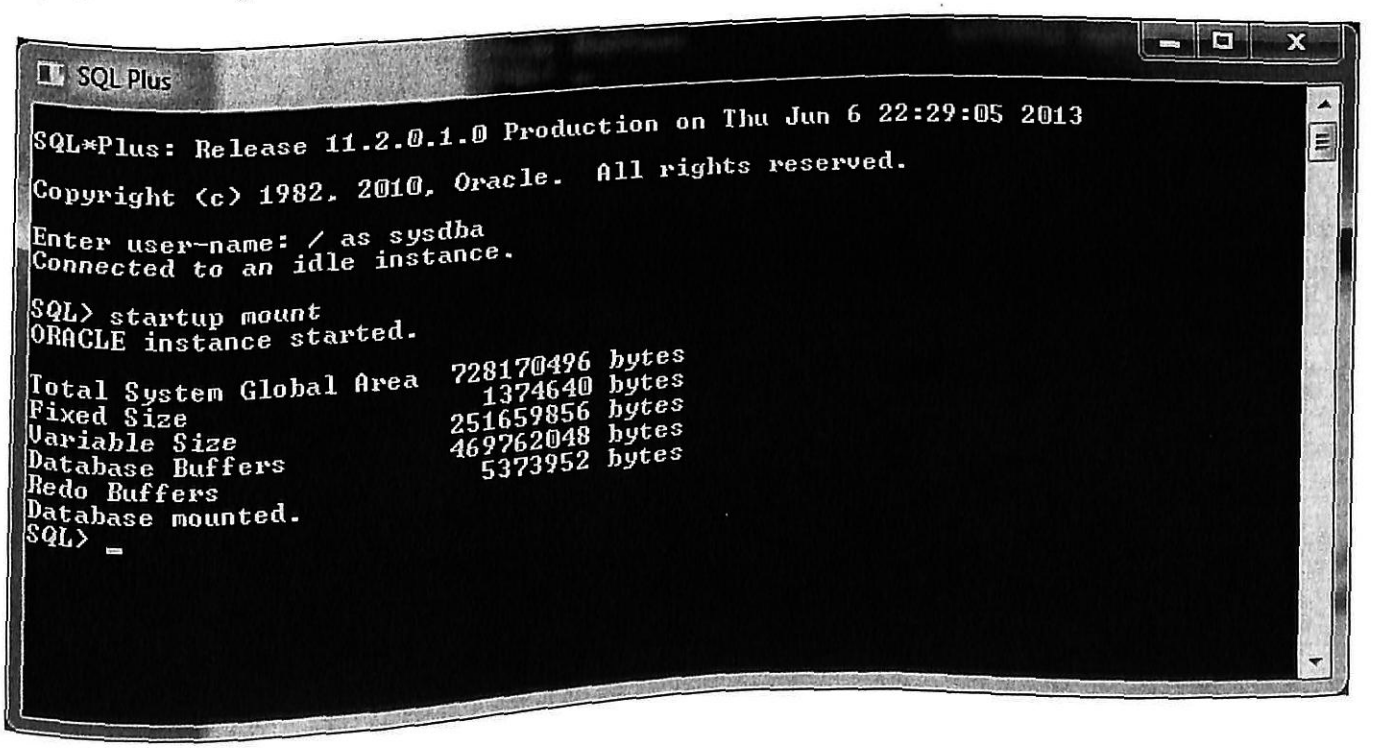


Figure 3.2.2. SQL Plus Screen. Starting DB mounted.

OPEN
✓ Read Parameter File
✓ Allocate SGA
✓ Start Background Processes
✓ Open and Read Control File
✓ Open All Database Files
✓ SGA and Background Processes Running, Control Files Open, All Database Files Open
✓ Default OPEN state for database and is accessible by users and applications
✓ Specified by STARTUP or STARTUP OPEN

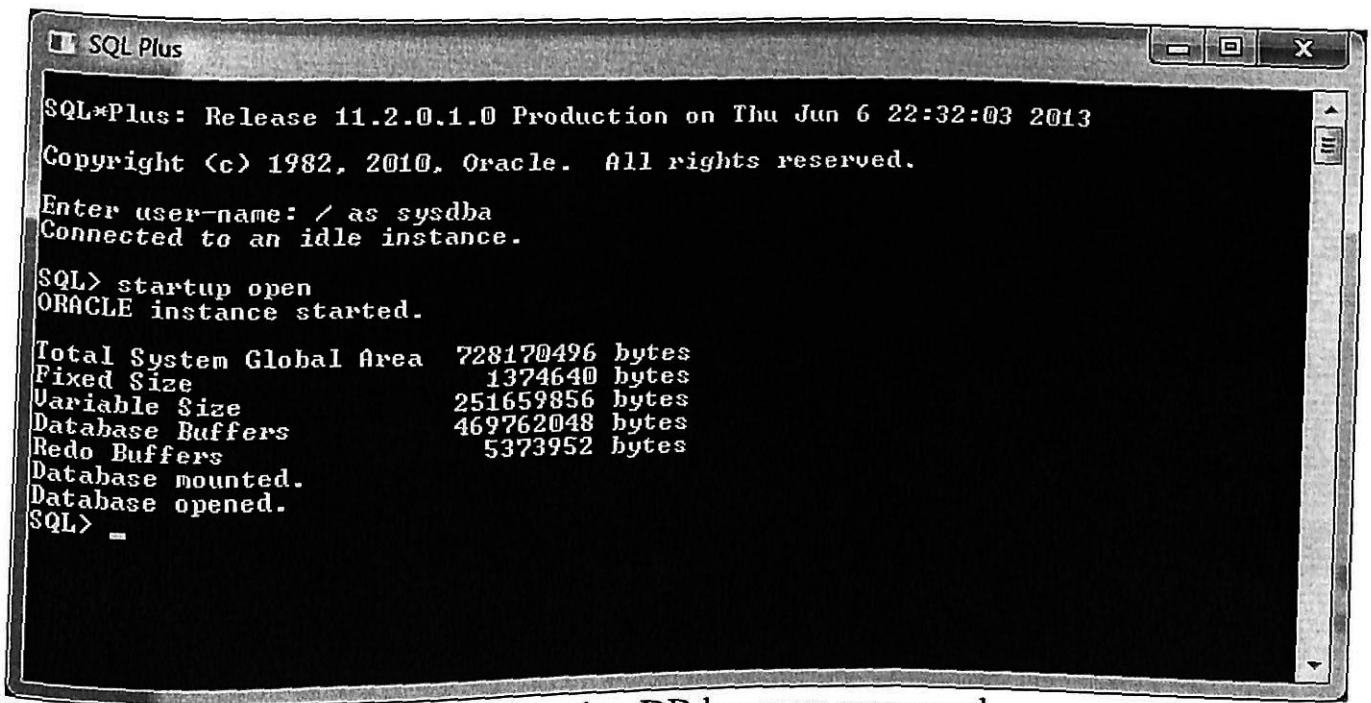


Figure 3.2.3. SQL Plus Screen. Starting DB by open command.

If you want to block all or some users even though the database is in OPEN state. You put the database in RESTRICTED SESSION mode via these ways:

✓ STARTUP RESTRICT
✓ ALTER SYSTEM ENABLE RESTRICTED SESSION

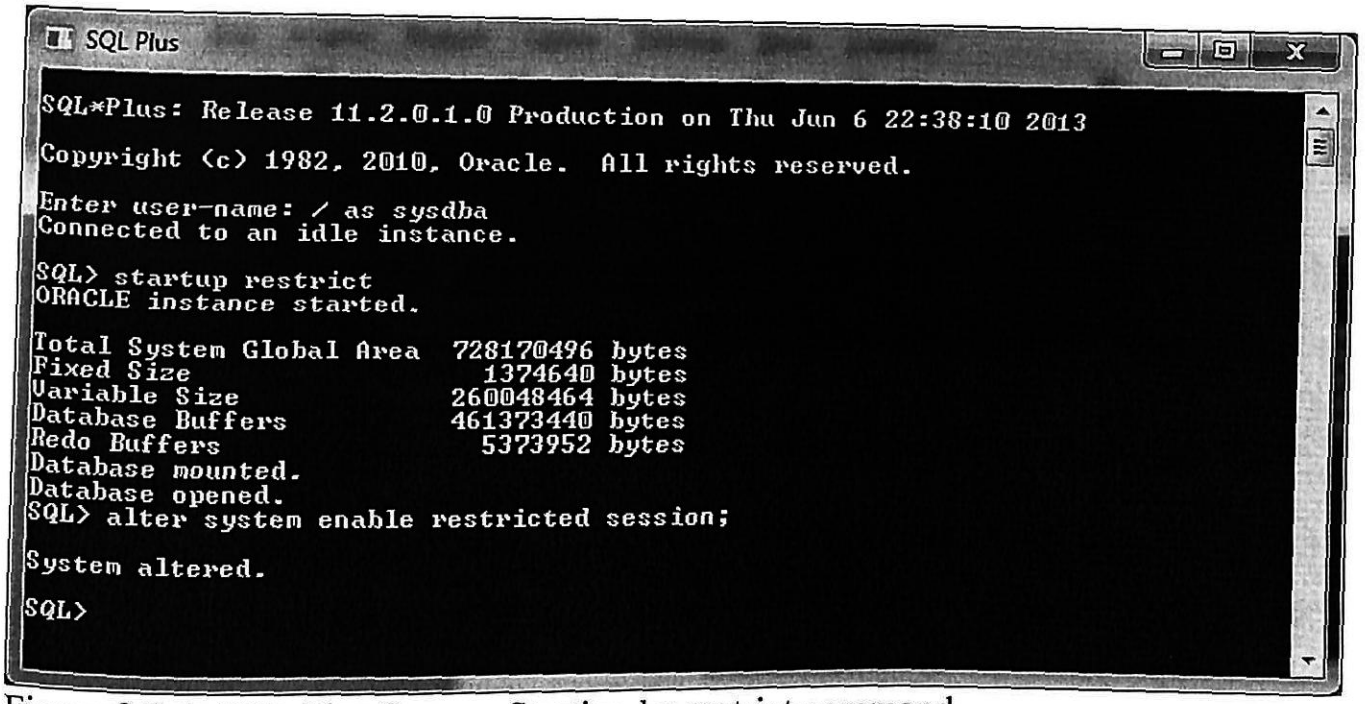


Figure 3.2.4. SQL Plus Screen. Starting by restrict command.

If you try to connect by any users except which is in group DBA, you will get message like this.

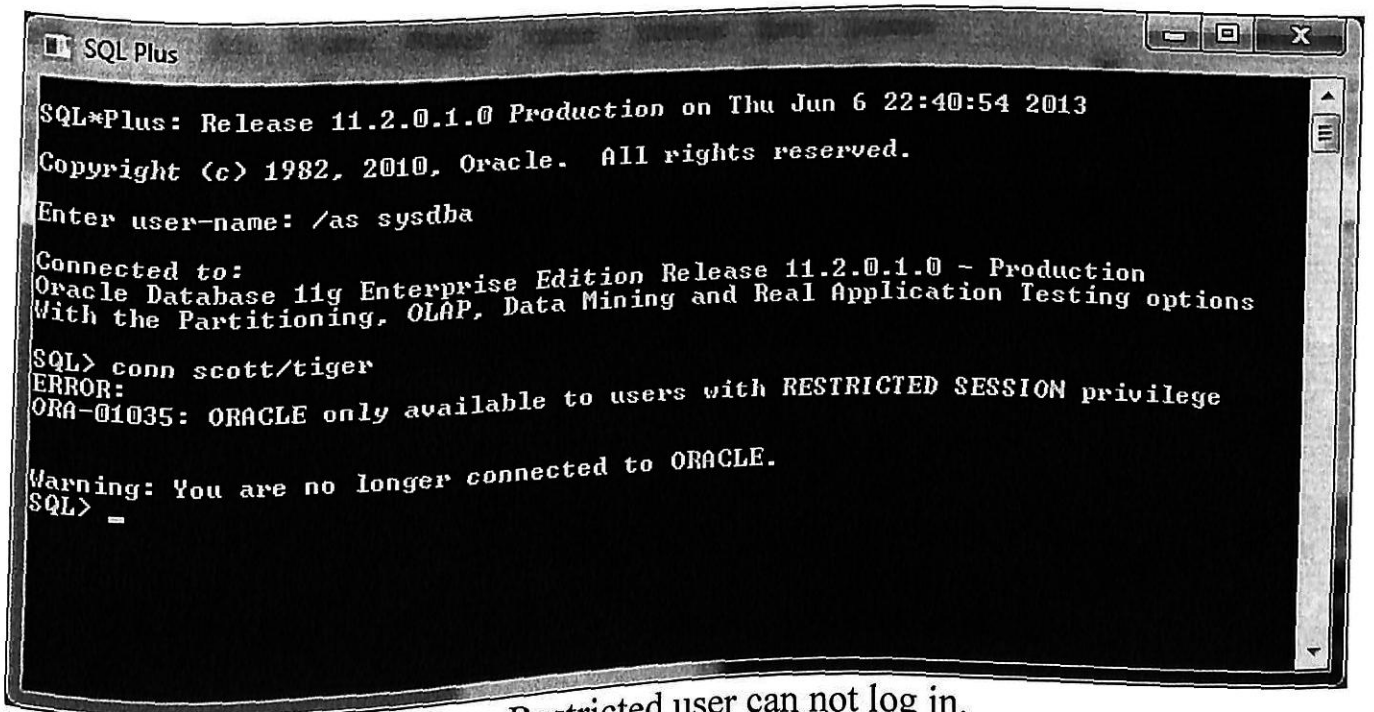


Figure 3.2.5. SQL Plus Screen. Restricted user can not log in.

To have access to restricted session you have to grant users which you to work with database like below.

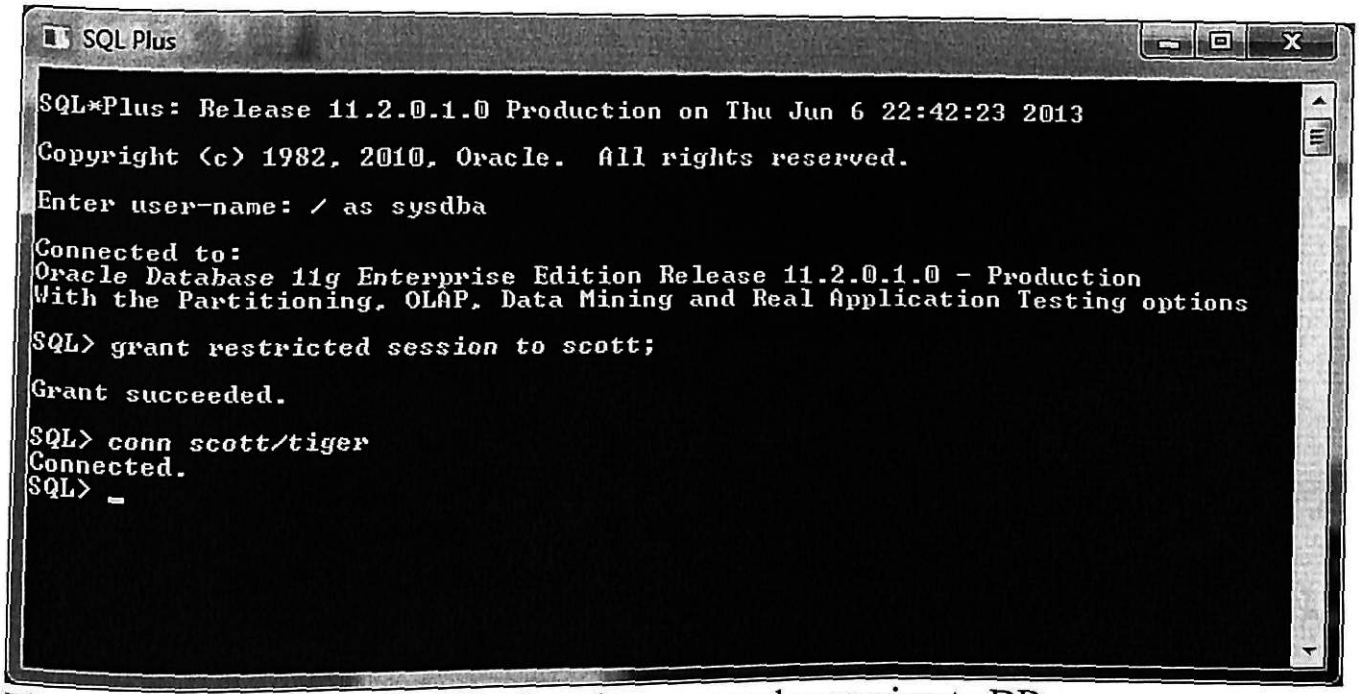


Figure 3.2.6. SQL Plus Screen. Granting user and accessing to DB.

3.3. Stopping the database

When a database needs to be shut down, several methods exist to do so with varying effects on current users and their transactions.

SHUTDOWN [NORMAL] – It takes very long time! I don't suggest you, ha if you can wait days so you can close with this type.

✓ New connections to the database are denied.
✓ Existing transactions continue normally until either they roll back or commit.
✓ Users log out normally on their own.
✓ After the last user logs out, database file headers are updated and files are closed.
✓ SGA is shut down.
✓ Background processes are terminated.
✓ Specified by the SHUTDOWN or SHUTDOWN NORMAL command.

SHUTDOWN TRANSACTIONAL – It is also like normal type takes long time.

✓ New connections to the database are denied.
✓ Existing transactions continue normally until either they roll back or commit.
✓ After an existing transaction is completed, user sessions are terminated.
✓ Database file headers are updated and files are closed.
✓ SGA is shut down.
✓ Background processes are terminated.
✓ Specified by the SHUTDOWN TRANSACTIONAL command.

SHUTDOWN IMMEDIATE – I really suggest this type of closing instance cos, it's really practical way.

✓ New connections to the database are denied.
✓ Existing transactions are rolled back.
✓ User sessions are terminated.
✓ Database file headers are updated and files are closed.
✓ SGA is shut down.
✓ Background processes are terminated.
✓ Specified by the SHUTDOWN IMMEDIATE command.

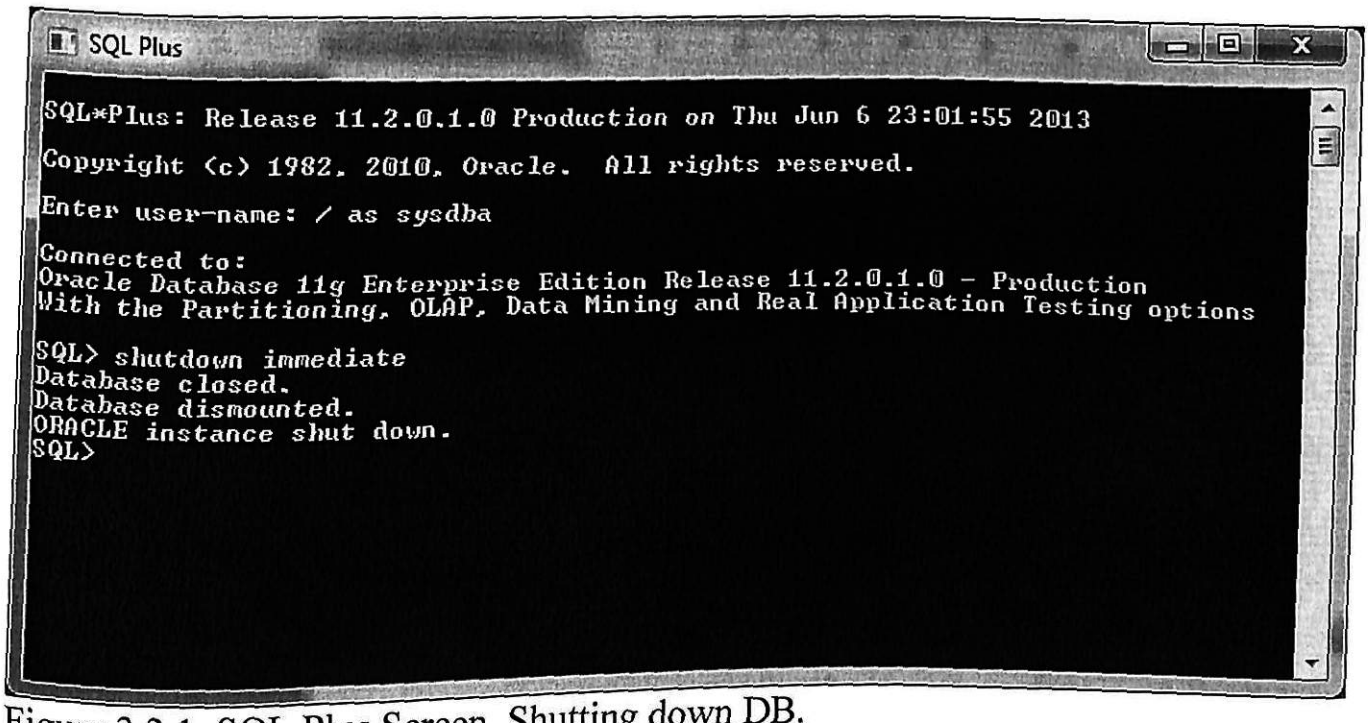


Figure 3.3.1. SQL Plus Screen. Shutting down DB.

SHUTDOWN ABORT – It is very critical type of closing because after this type of closing you should to recover you database and also there will be risks that database will not start and work normal.

✓ New connections to the database are denied.
✓ Existing transactions are not rolled back.
✓ User sessions are terminated.
✓ SGA is shut down.
✓ Background processes are terminated.
✓ Specified by the SHUTDOWN ABORT command.
✓ Instance recovery is required on startup.

4. Using SQL Language

You can connect by command prompt or SQL*Plus and there you can work with database by using SQL language

COMMAND LINE

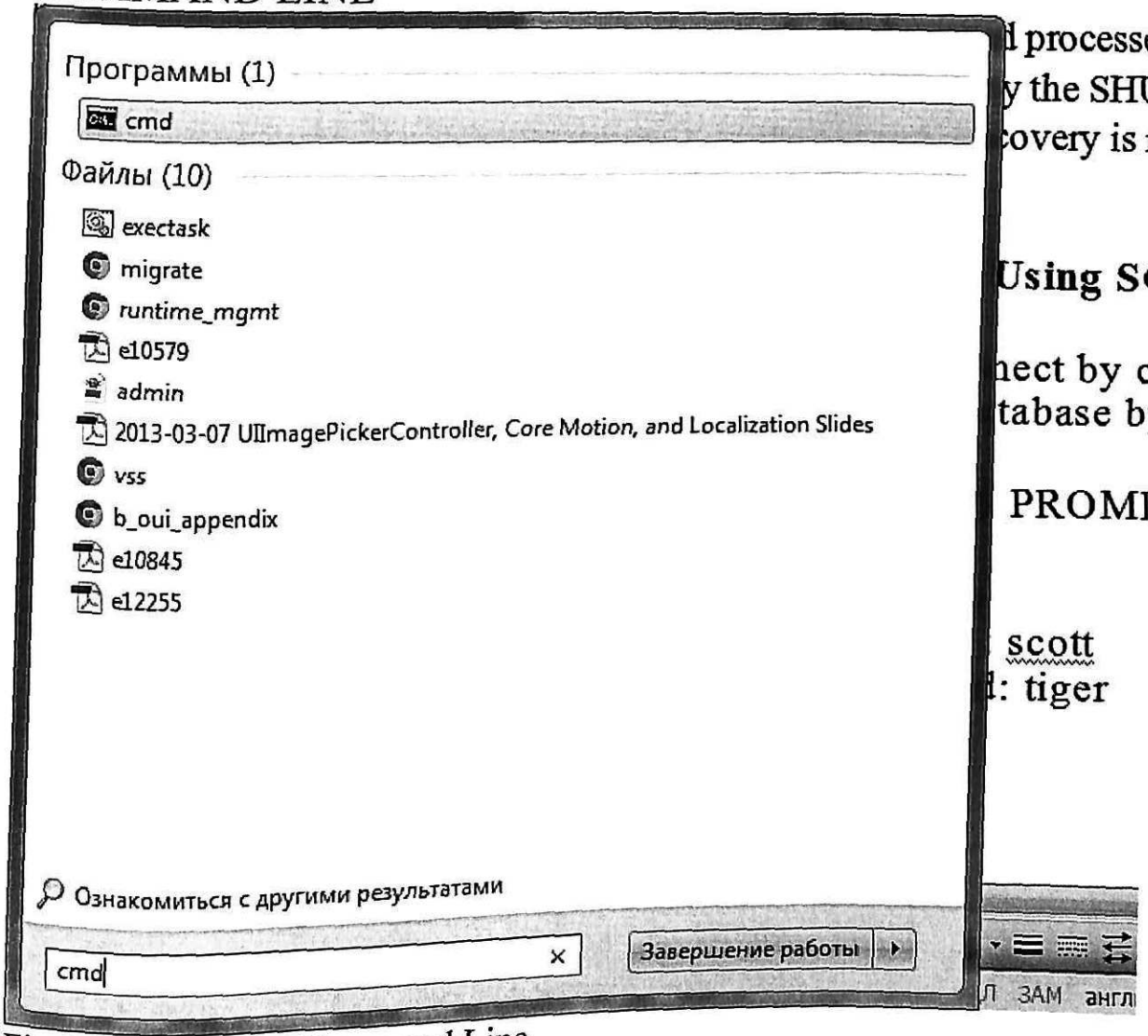


Figure 4.1. Starting Command Line.

Start cmd
write sqlplus
than user ex.: scott
and password: tiger
And you can work by using any commands in Table 1

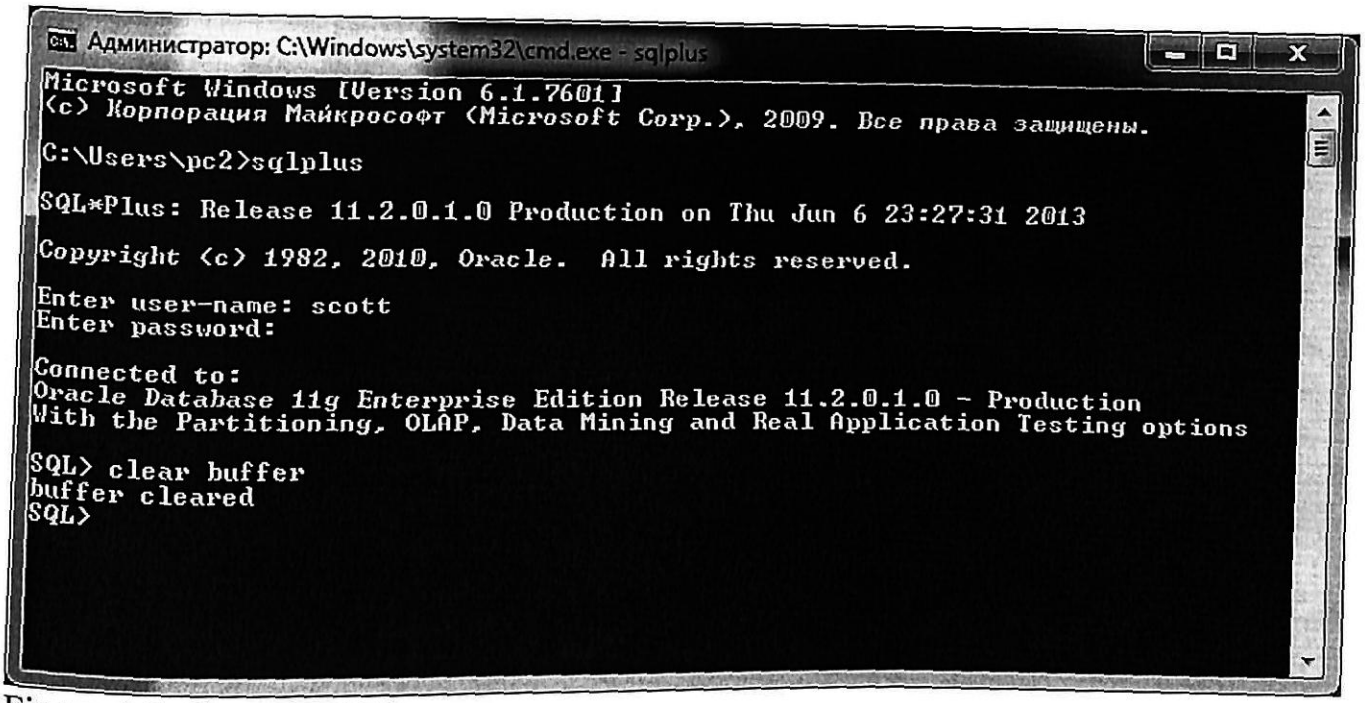


Figure 4.2. Command Line.

Or you can open SQL*Plus and work on it by using commands below in Table 1

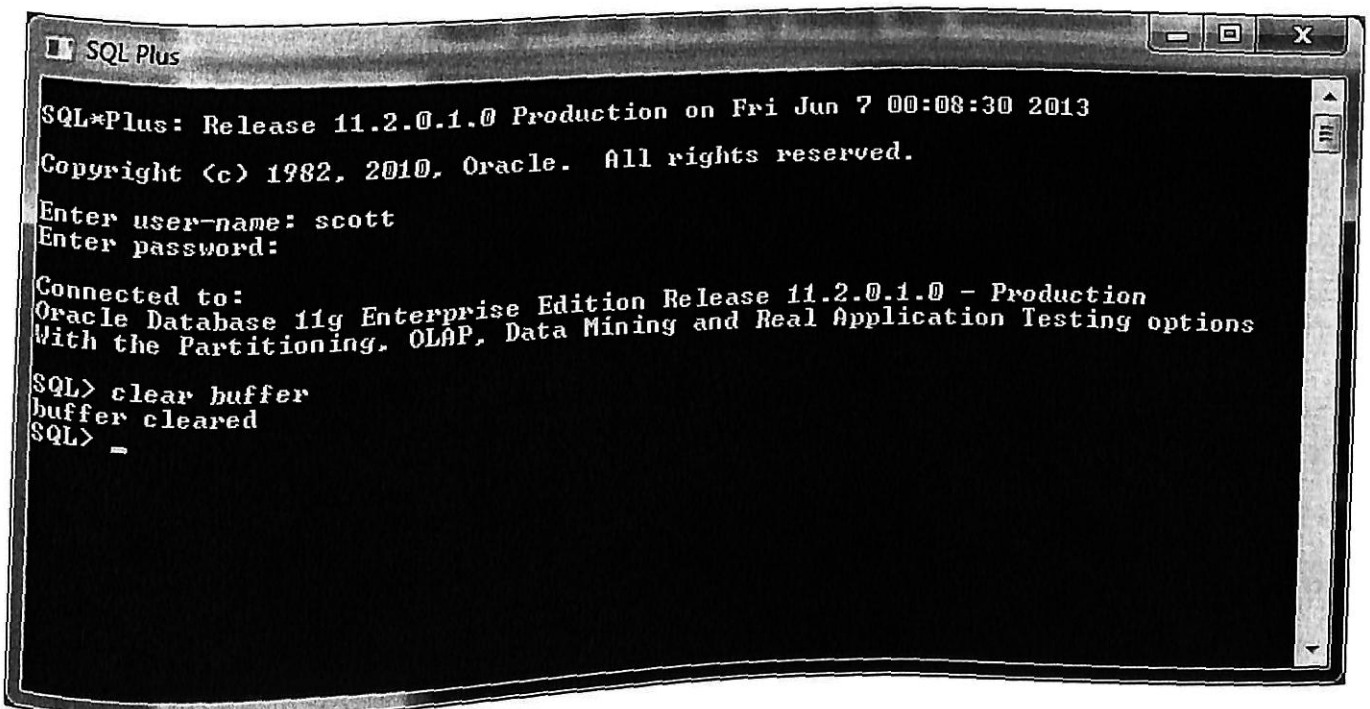


Figure 4.3. SQL Plus Screen.

Table 4.1.	SQL*Plus Commands and Abbreviations	
Command	*Abbreviation*	*Usage*
APPEND text	A text	Adds text to end of the current line
CHANGE/old/new	c/old/new	Changes old text to new text on current line
CLEAR BUFFER	CL BUFF	Erases the buffer
CONNECT user	CONN user	Connects as user
DEL	none	Deletes the current line
DEL n	none	Deletes the line number n
DEL LAST	none	Deletes the last line
EDIT	ED	Opens buffer into the default editor (vi/notepad)
EDIT filename	ED filename	Opens file with default editor
GET filename	none	Loads filename into buffer; does not execute
INPUT	I	Adds one or more lines after current line
LIST	L or ;	Lists all lines in the buffer
LIST n	L n or n	Lists line n
SAVE filename	SAV filename	Saves buffer contents to file
SET	SET option	Sets many available SQL*Plus options
SPOOL	SPO filename	Saves output to a file on the operating system
START	STA, /, ; or @	Runs the current statement in the buffer
START filename	STA filename	Loads file into buffer and executes
QUIT or EXIT	—	Quits SQL*Plus

SQL language elements

✓ Data Query Language (DQL) - DQL is often used to select data from the database in the form of columns. At the least, it contains the key words SELECT and FROM with an optional WHERE, GROUP BY, and ORDER BY.[1]

✓ Data Manipulation Language (DML)- DML adds, updates, or deletes data. Its three key words are INSERT, UPDATE, and DELETE.[1]

✓ Data Control Language (DCL) - Used to define privileges in a database to objects with key words like GRANT or REVOKE.[1]

✓ Data Definition Language (DDL) - DDL defines objects in a database. Its most used key words are CREATE, DROP, ALTER, and TRUNCATE. It creates, drops, or alters objects in the database like tables, views, or stored procedures.[1]

5. Using Enterprise Manager and Populating the Database

To open Enterprise Manager (EM) go to start in Oracle - OraDb11g_home1 select Database Control (- sdu).

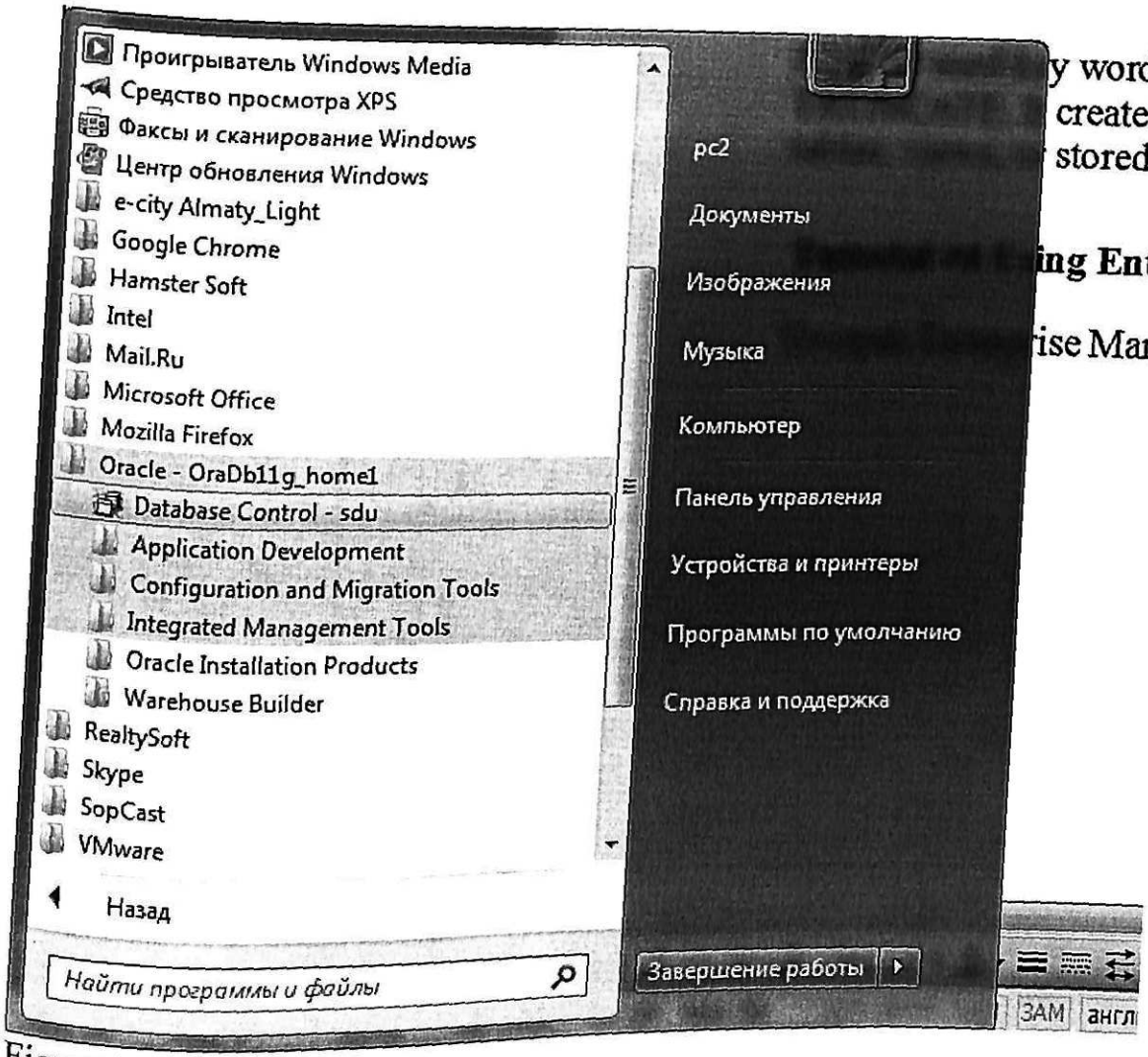


Figure 5.1. Start menu.

It will open in default browser, and ask you to perform risks, click Continue anyway.

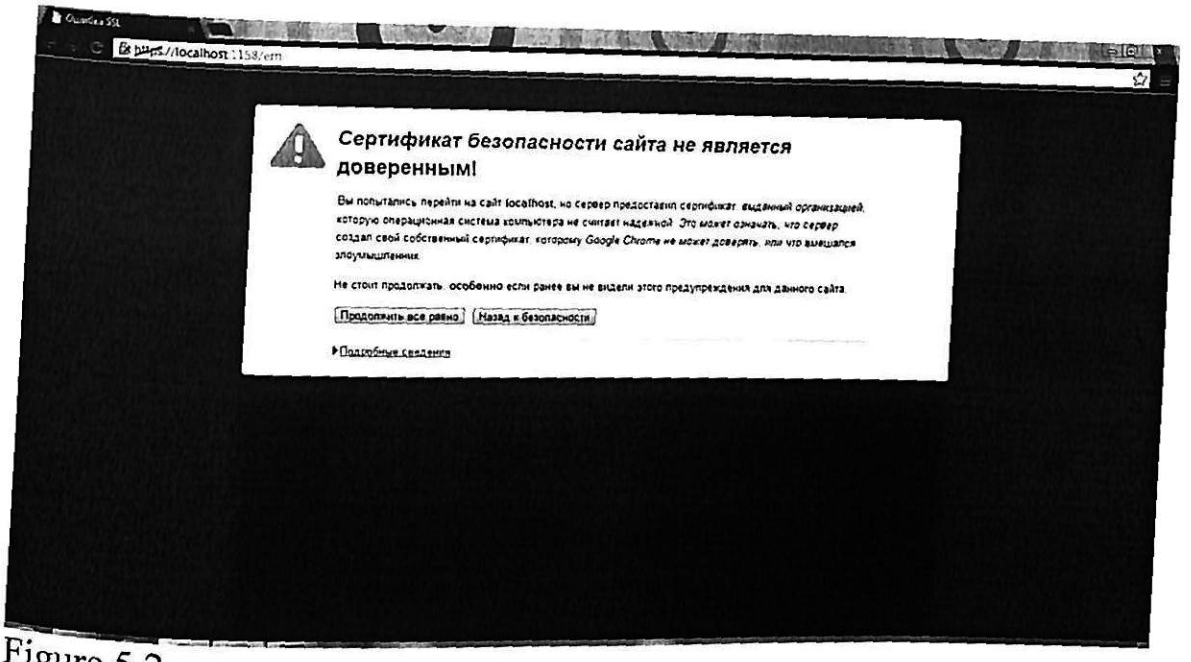


Figure 5.2.

This screen will appear. Enter user sys as sysdba. Here you use password which you wrote when installing DB.

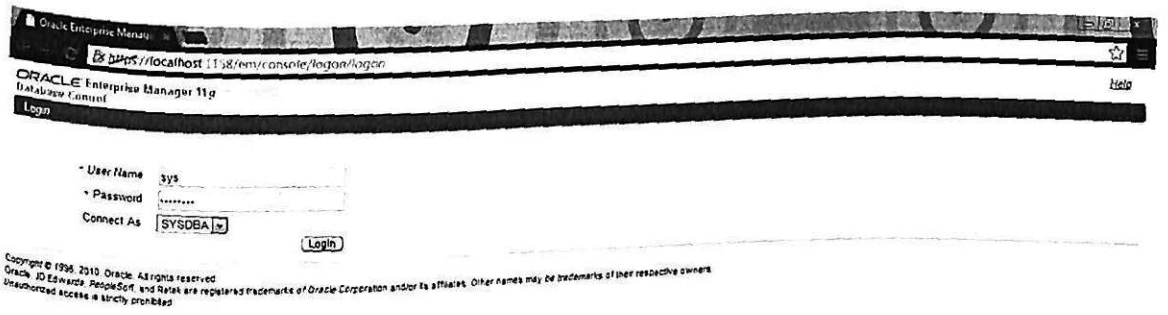


Figure 5.3. Starting page EM.

5.1. Create Tablespaces

In Server part where Storage menu you can see Tablespace, click on it

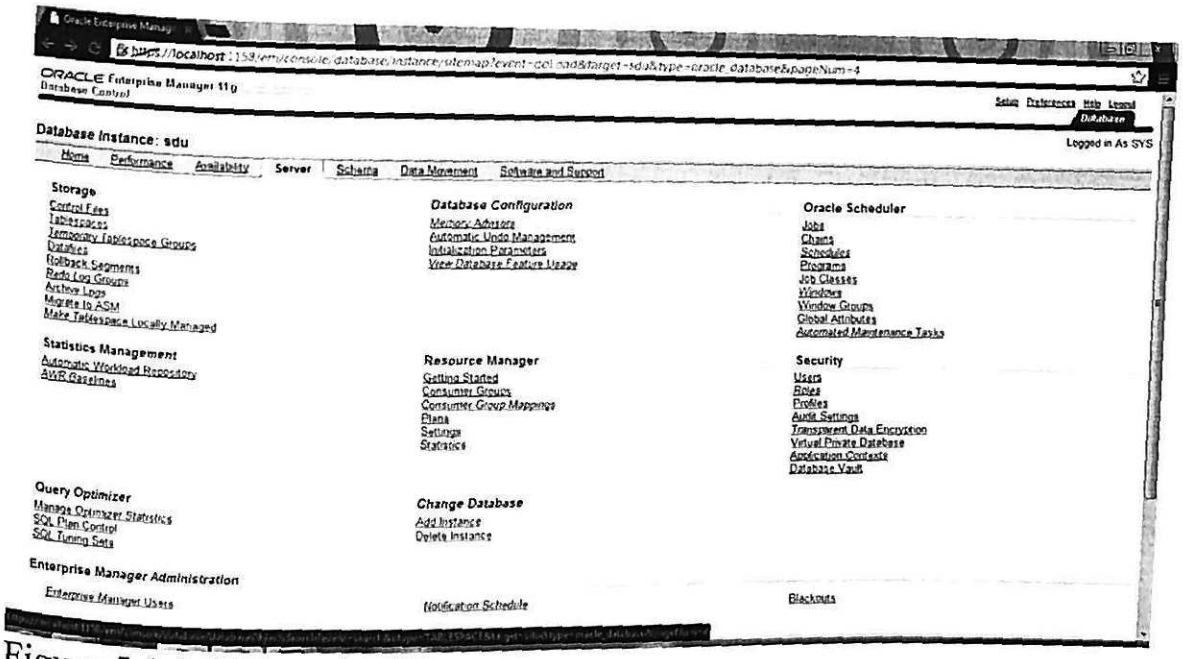


Figure 5.1.1. Enterprise Manager.

Here you can see list of Tablespaces and there is a create button click on it.

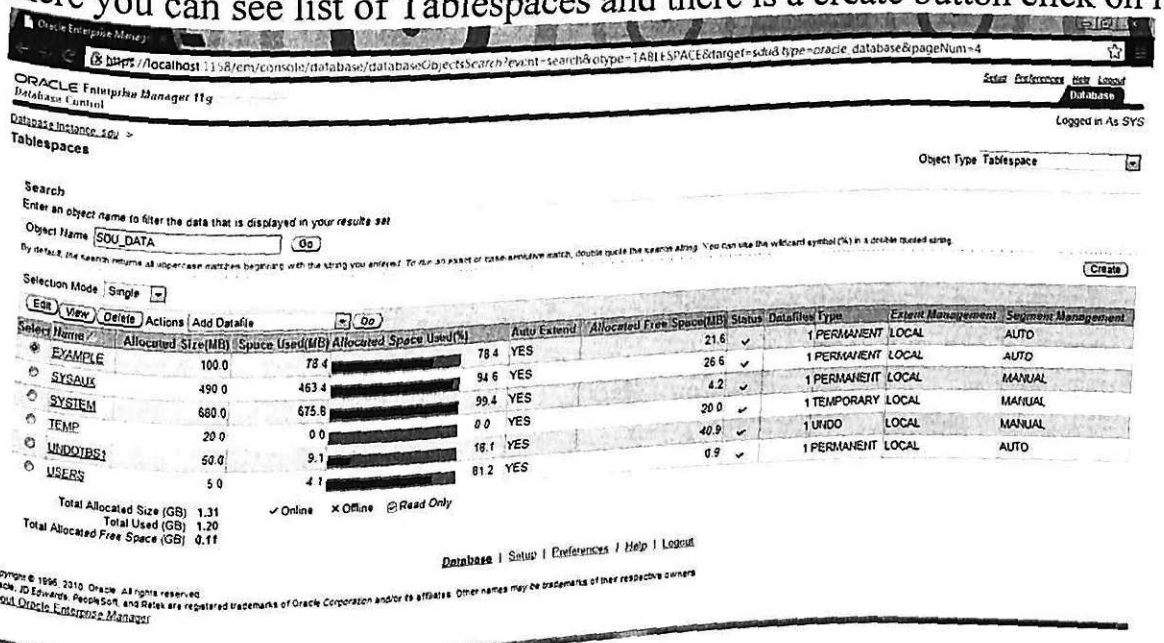


Figure 5.1.2. Enterprise Manager.

1. In the General Options screen, type a tablespace name. In this example, I've named the tablespace SDU_DATA.

2. Click the Storage tab and choose Extent Management:
• Locally Managed: Default for most tablespaces; the recommended option because object definitions are stored and tracked at the local tablespace level.[4]
• Dictionary Managed: Method common in previous versions of Oracle in which object management is stored in the SYSTEM tablespace. Generally not recommended.[4]

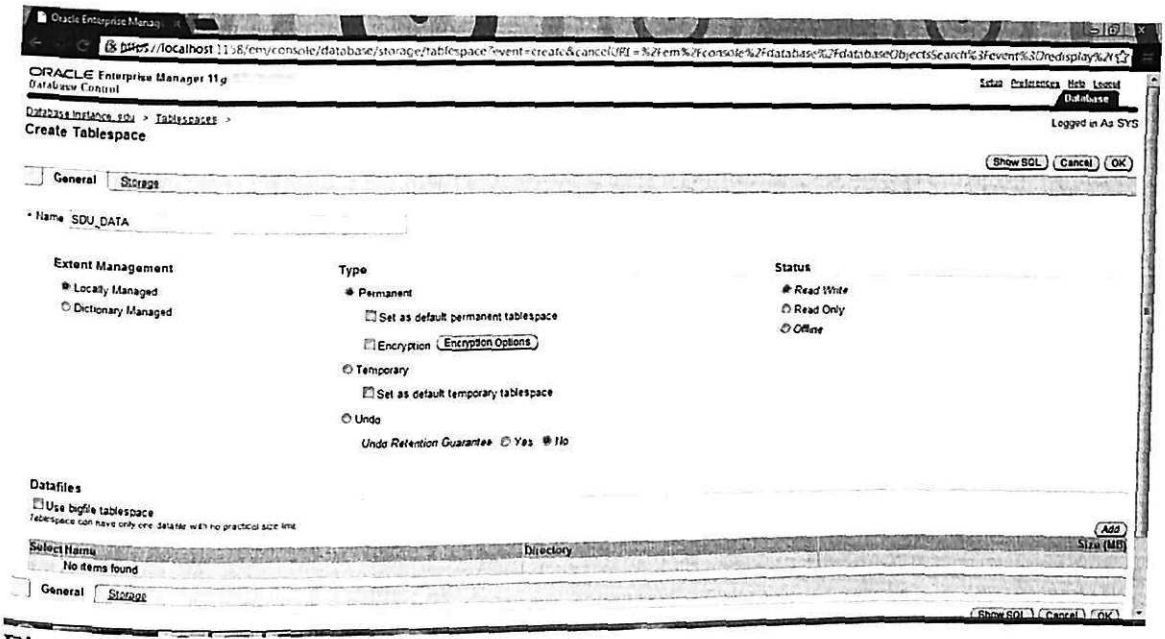


Figure 5.1.3. Enterprise Manager.

3. Select a Type:
    - Permanent: Objects exist permanently
    - Temporary: Objects that exist temporary in database; not permanent
    - Undo: Undo (aka rollback) tablespace type
4. Choose a Status:
    - Read Write: If tables and data will be created in this tablespace.
    - Read Only: Data is in read only mode and can only be queried. It is also not backed up by standard backups.
    - Offline: Content is offline and cannot be accessed.
5. Click the Add button.
    You can see an added data file and filename for SDU_DATA.
6. Enter the file's name and path.

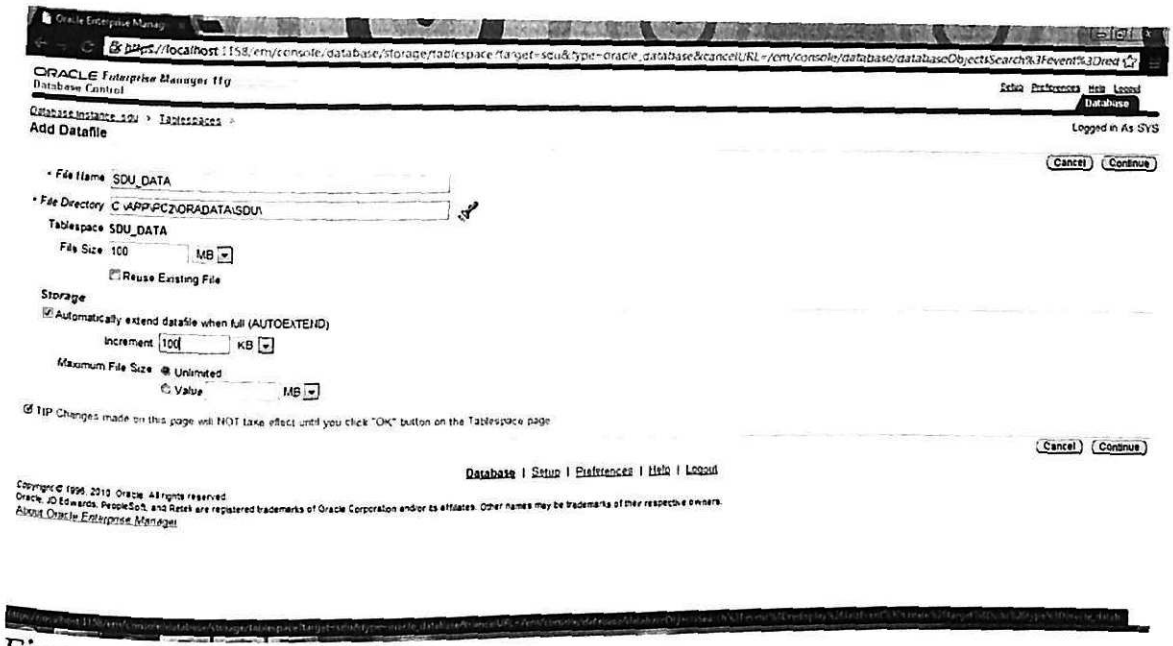


Figure 5.1.4.

7. Type the file size.

8. Choose units from the File Size drop-down menu. I choused 100 KB, which you can expand as objects grow. Also, you can add more data files to the tablespace if you want to grow onto separate disks. To add additional data files, click on the Add button at the bottom right of the Create Tablespace screen that was shown in upper.

9. Choose the Storage tab from the Create Tablespace screen.

10. Choose a Segment Space Management option:
    - Automatic: For ease of management, let Oracle manage the extent and segment growth.[4]
    - Manual: Manually specify the size of each unit of allocation.[4]

Than after the clicking continue appears screen below where you should click OK.

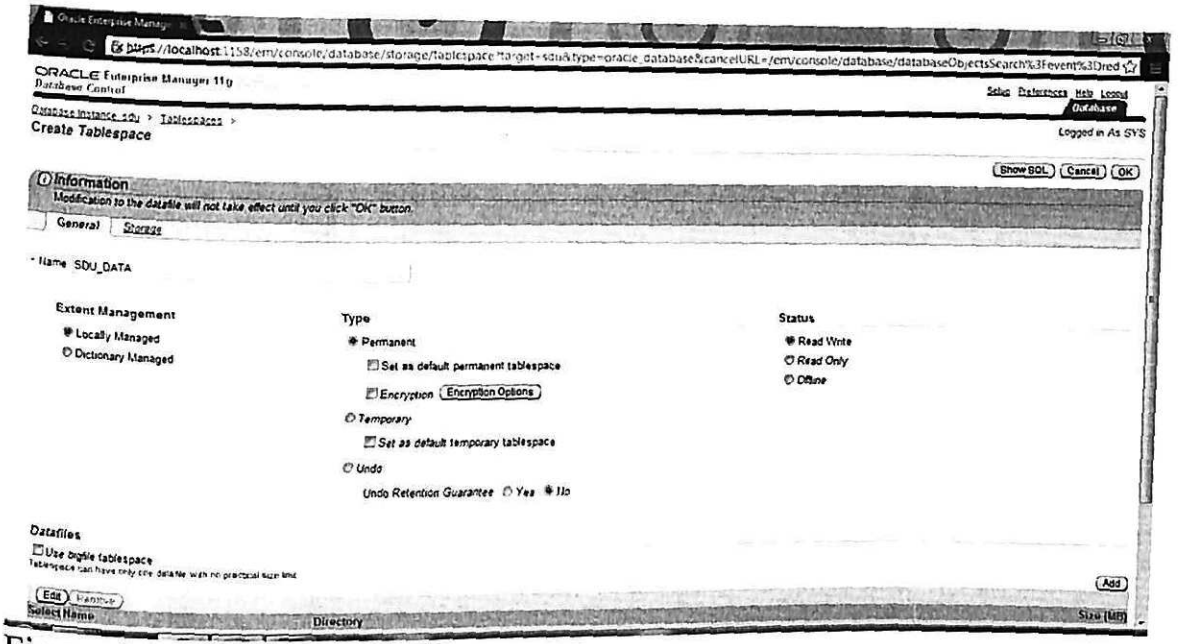


Figure 5.1.5. Enterprise Manager.

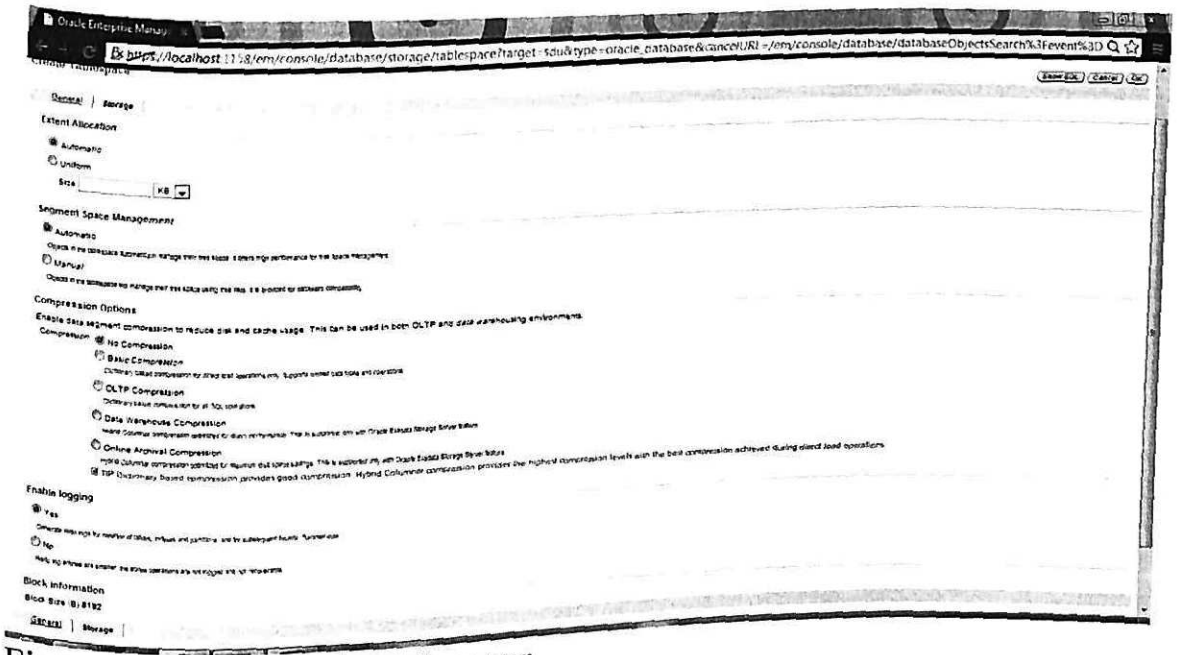


Figure 5.1.6. Enterprise Manager.

So here we've created a new Tablespace.

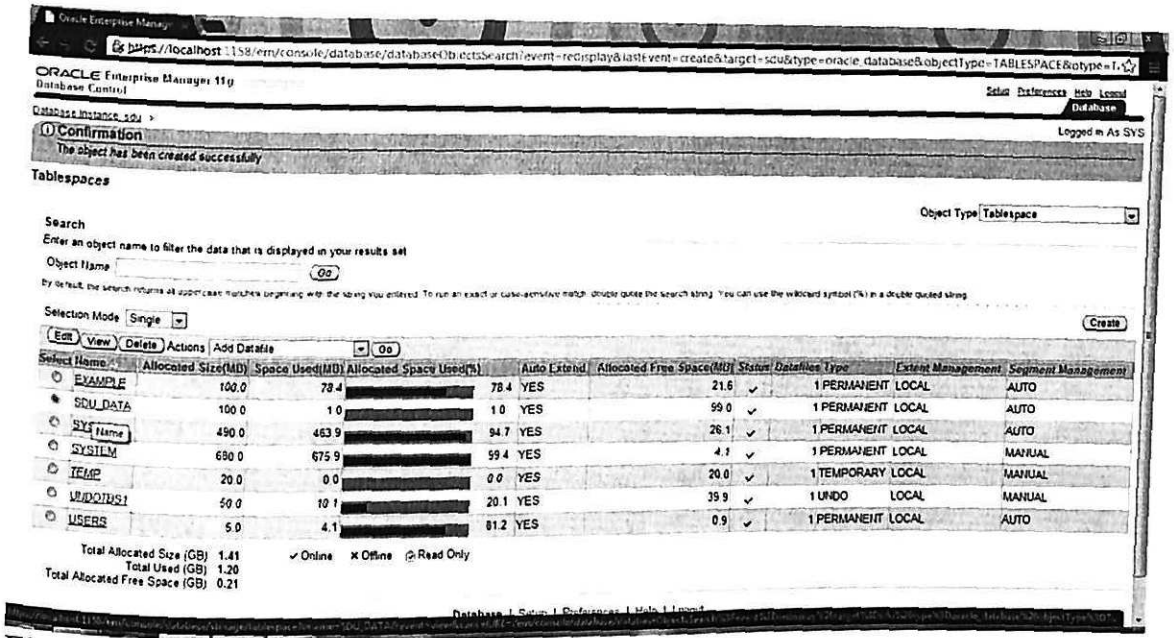


Figure 5.1.7. Enterprise Manager.

5.2. Create USERS and SCHEMAS

1. Choose Security there Users to get to the user creation screen shown below

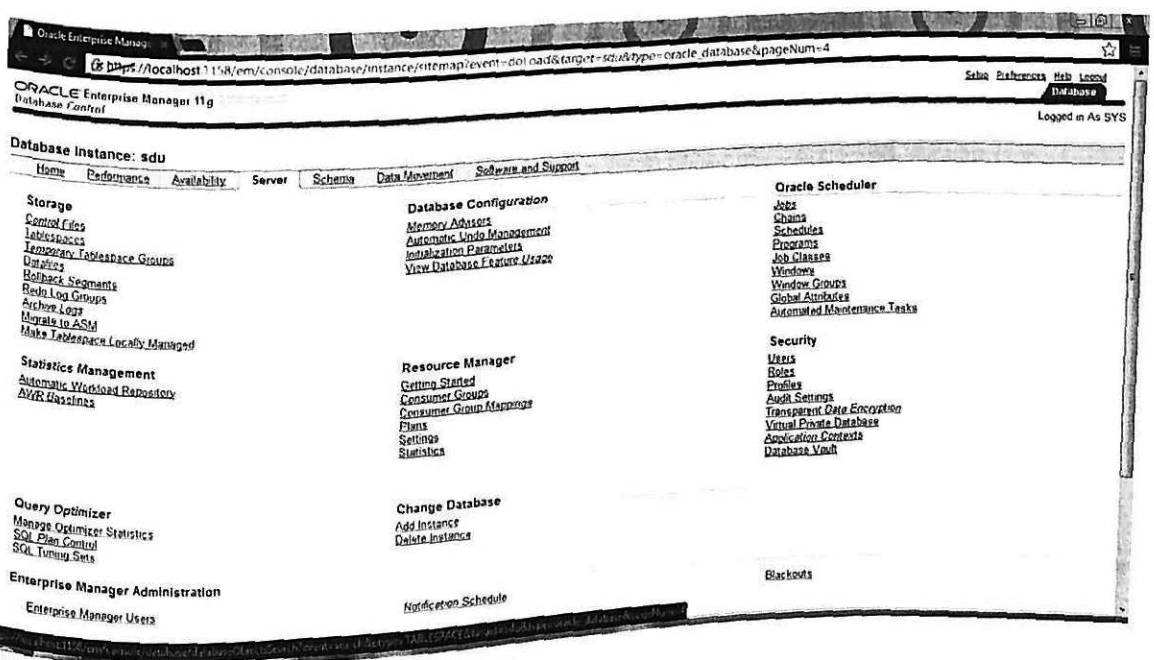


Figure 5.2.1. Enterprise Manager.

2. Click the Create button.

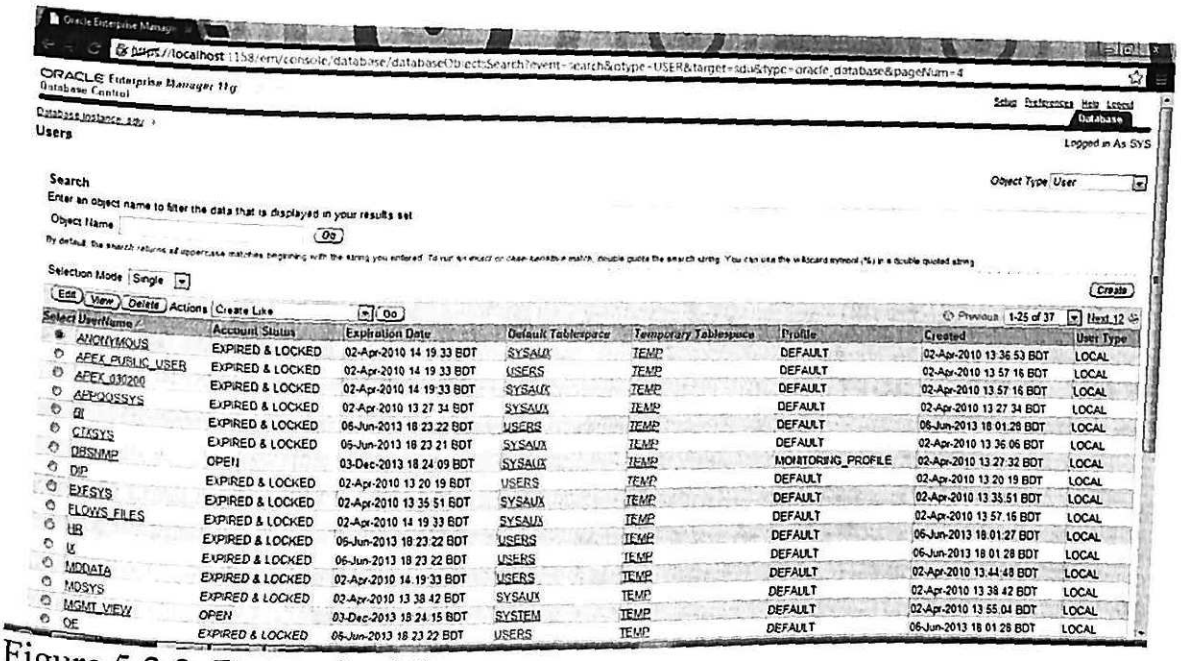


Figure 5.2.2. Enterprise Manager.

3. Enter the username, profile, password, and default and temporary tablespaces.

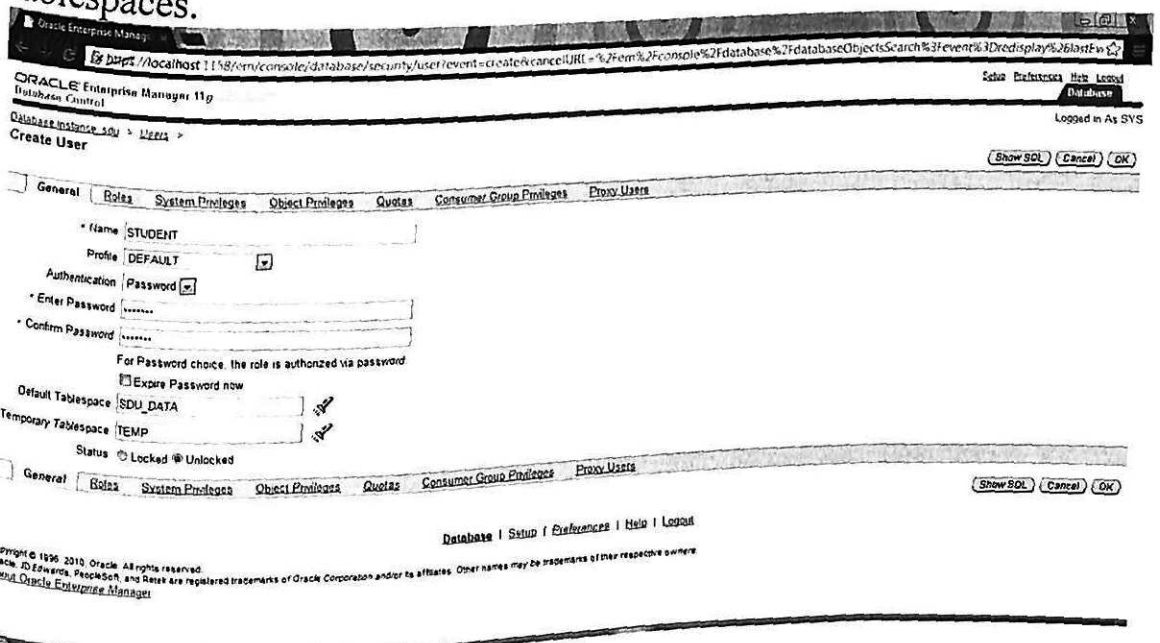


Figure 5.2.3. Enterprise Manager.

4. Click the Roles tab to grant CONNECT role to the STUDENT user. And also you can add other roles.

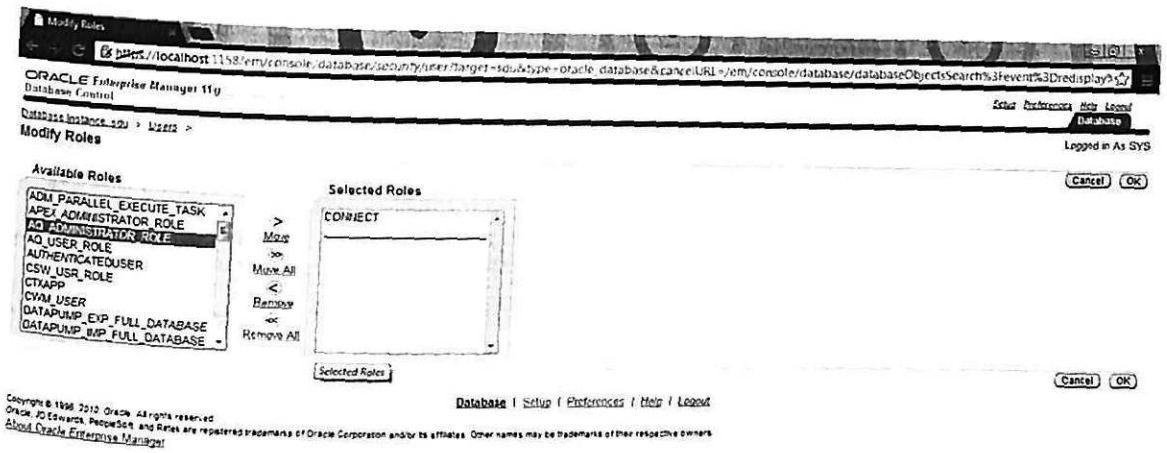


Figure 5.2.4. Enterprise Manager.

5. Click OK to create the user with the information you specified.

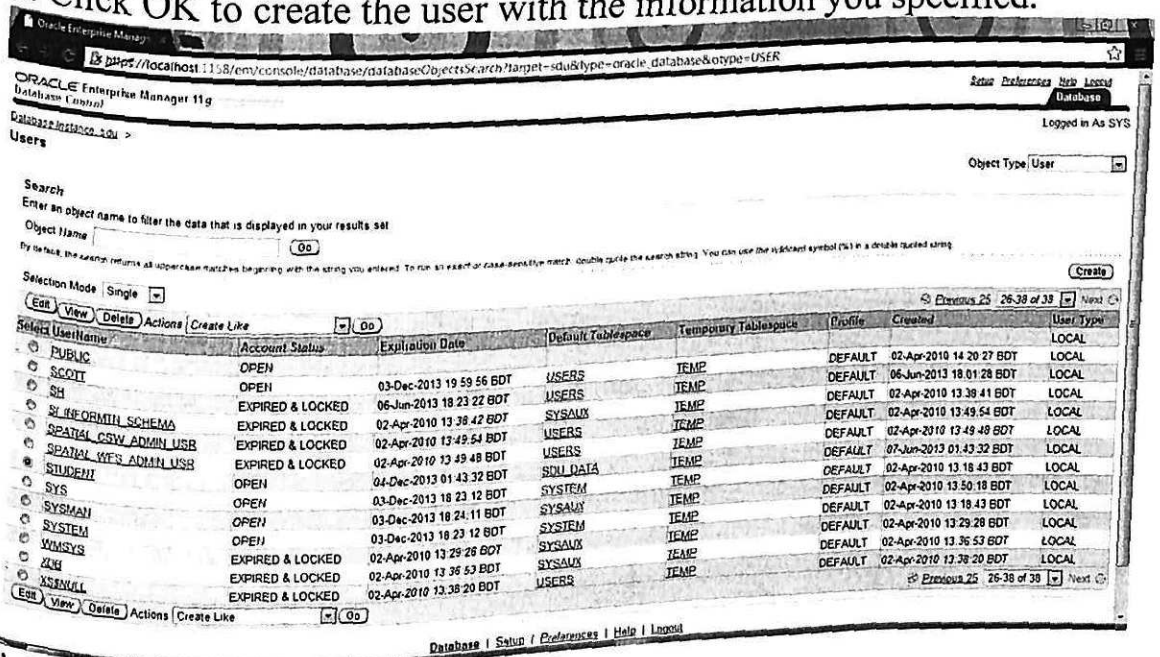


Figure 5.2.5. Enterprise Manager.

5.3. Creating Database Objects

1. Choose Schema, Database Objects there Table.

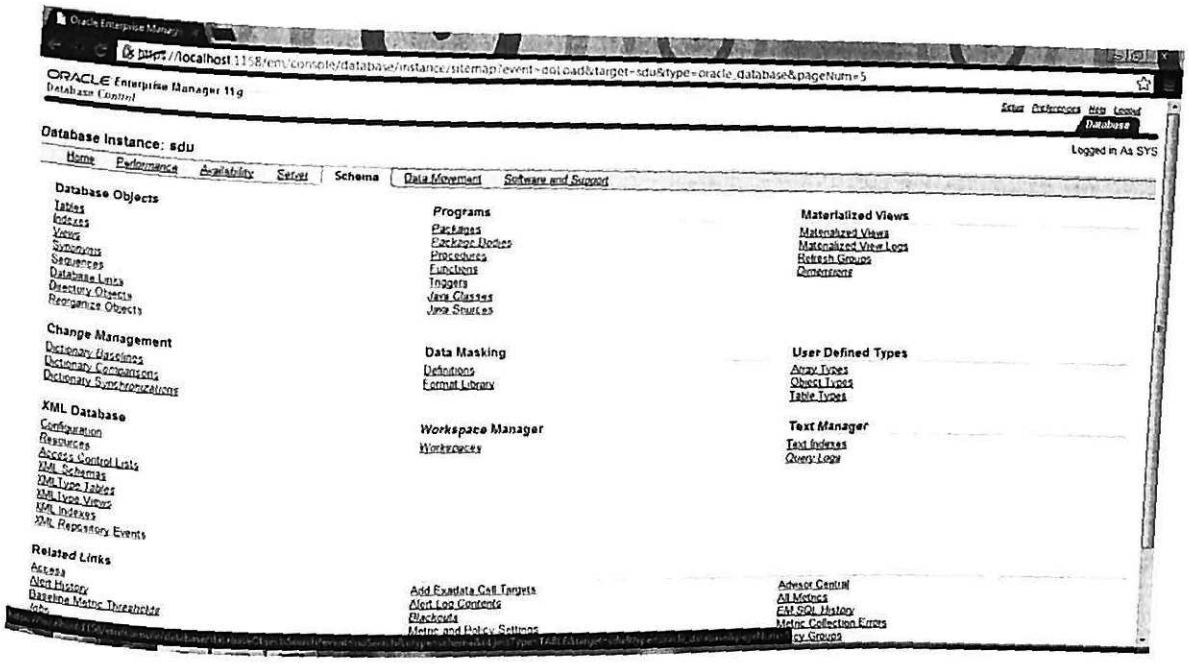


Figure 5.3.1. Enterprise Manager.

2. Use the CREATE TABLE option.

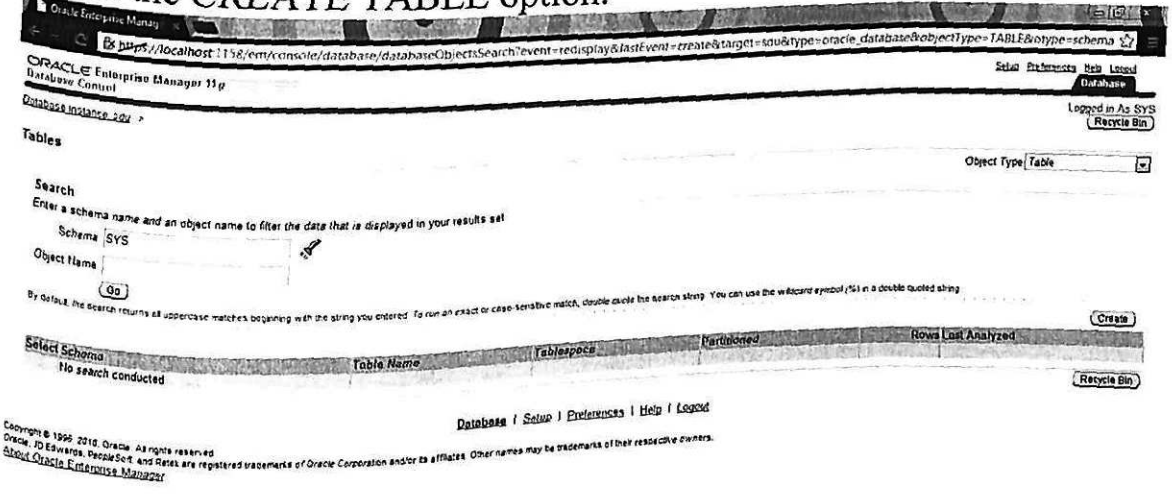


Figure 5.3.2. Enterprise Manager.
A wizard starts.

3. Select Standard for table.

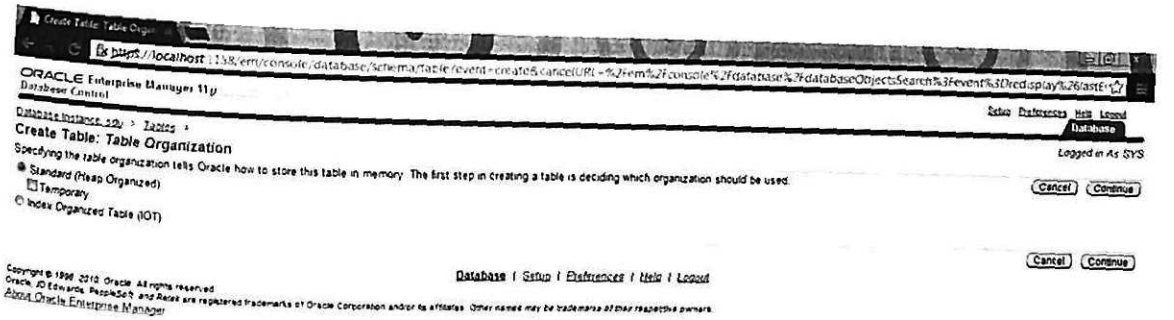


Figure 5.3.3. Enterprise Manager.

4. Enter tablespace and column information.

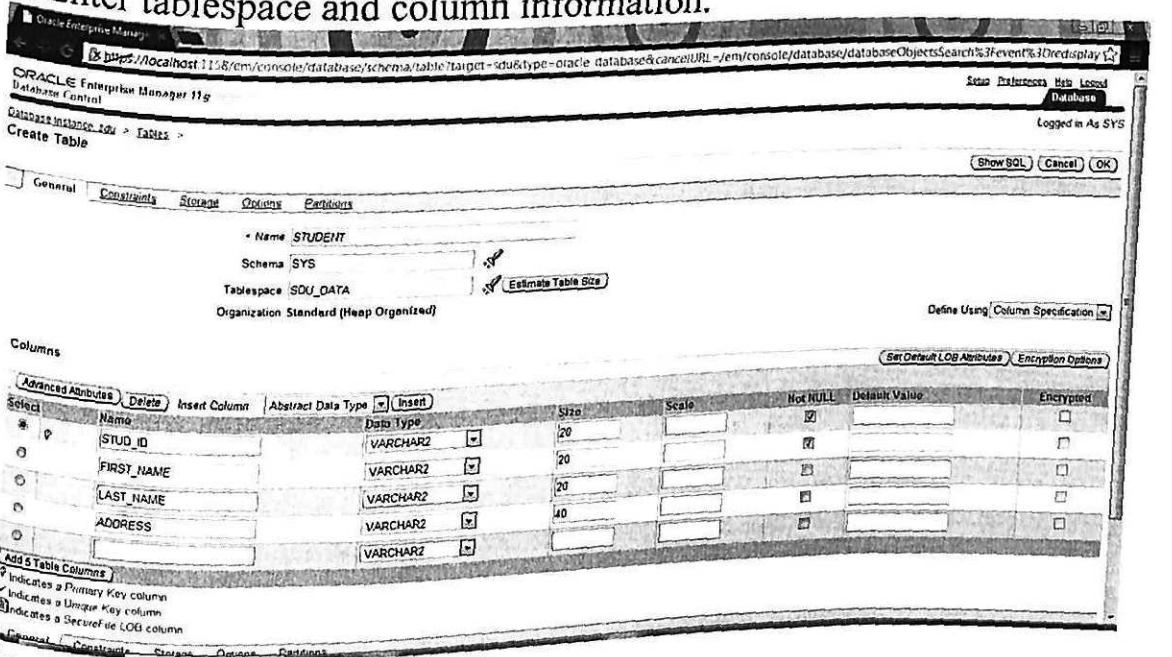


Figure 5.3.4. Enterprise Manager.

5. Choose the Constraints tab shown below

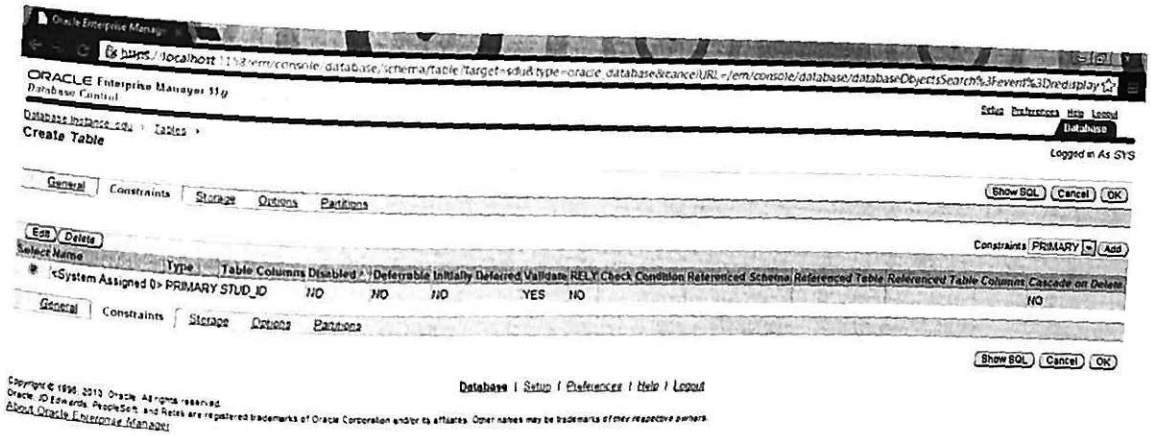


Figure 5.3.5. Enterprise Manager.

6. Create any necessary primary keys. Primary key is created on the STUD_ID column so that only unique, non-null values are allowed during inserts.

7. Click OK to create the table.

8. Grant SELECT, INSERT, UPDATE, DELETE privileges for the user to view and insert, update, and delete data. In this example, privileges are given to STUDENT.STUDENT and to the SDU_STUDENT role.

9. From the main Enterprise Manager screen, click Schema tab, Indexes, Create. The Create Index screen appear.

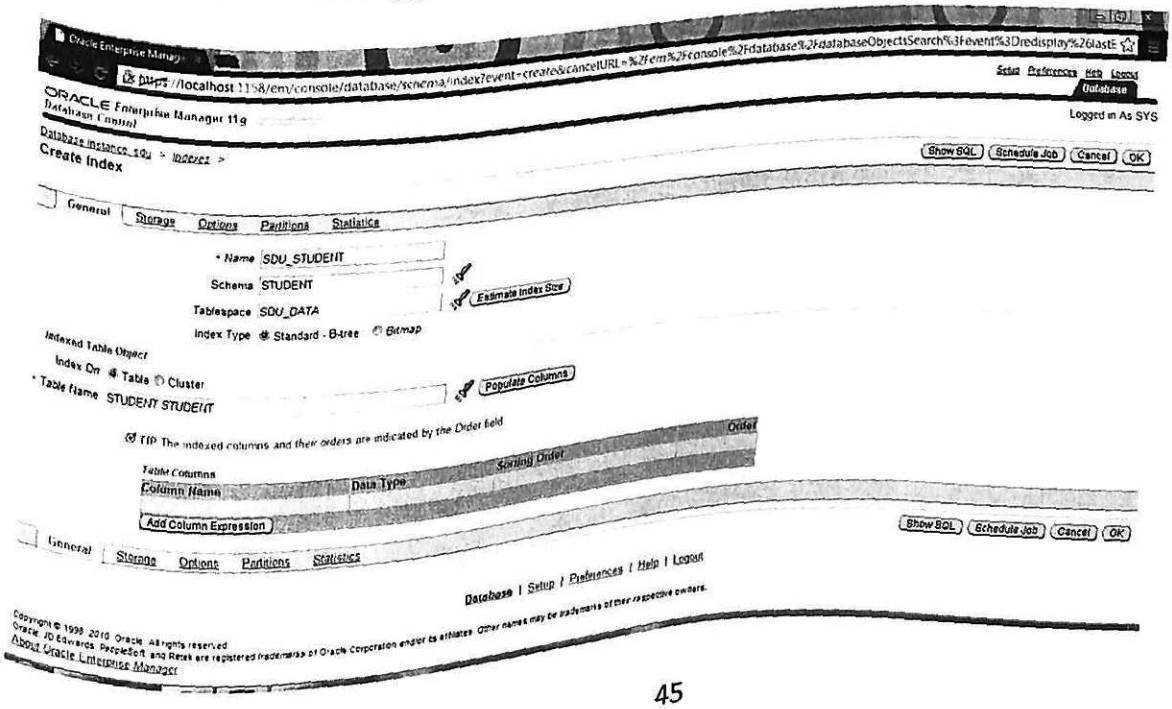


Figure 5.3.6. Enterprise Manager.

10. Select Create Index and fill in the appropriate values. index is being added to the STUDENT table. The index allows fast access to data where the SELECT statement uses the FIRST_NAME column as part of a join or WHERE clause.

11. Decide in what tablespace to store the index information. The SDU_DATA is indicated.

6. Caring for an Oracle Database

6.1. Protecting Oracle Database

6.1.1. Oracle Recovery Manager

Recovery Manager (RMAN as we lovingly refer to it) is Oracle's backup
recovery solution to protect the files in your database. It can recover from things
lost rows or lost objects, but its primary purpose is to restore and recover lost files.

6.1.1.1. Starting RMAN

1. Set your ORACLE_SID from the OS command line:
2. Launch RMAN:
3. Connect to the database you want to back up:

You have to connect to RMAN as SYSDBA. However, do not specify it. It i
included by default.

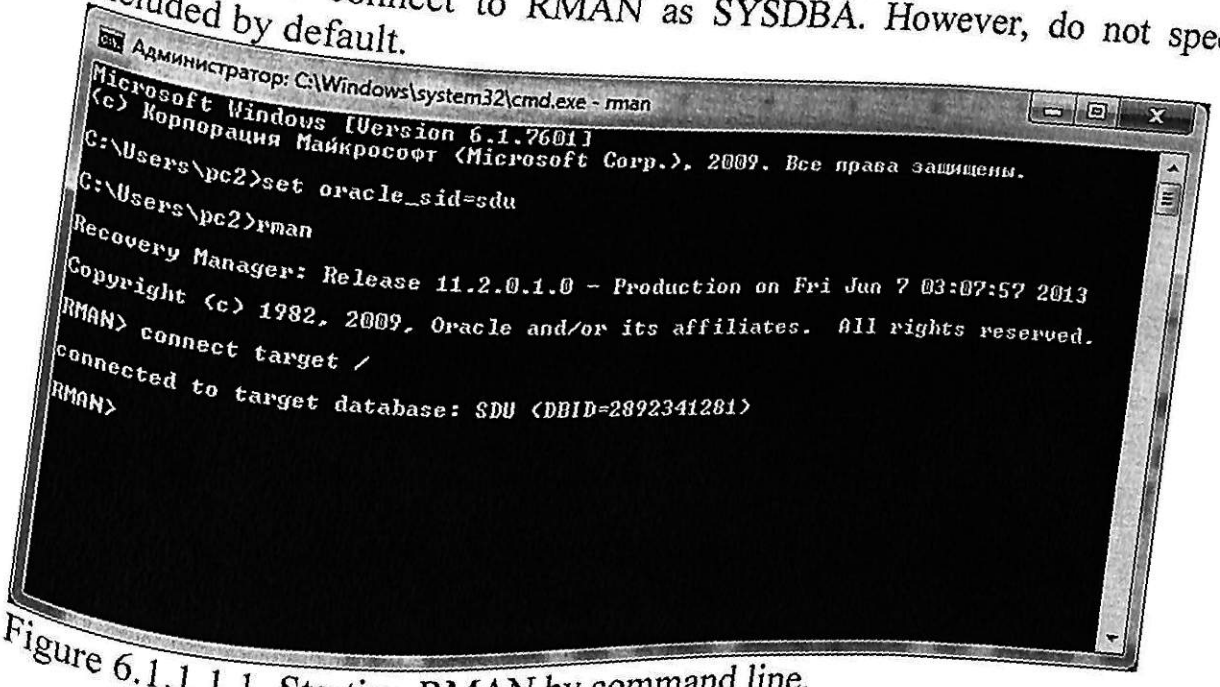


Figure 6.1.1.1.1. Starting RMAN by command line.

6.1.1.2. Configuring RMAN

1. Launch RMAN.
2. View a list of these parameters by typing the following: <show all;>

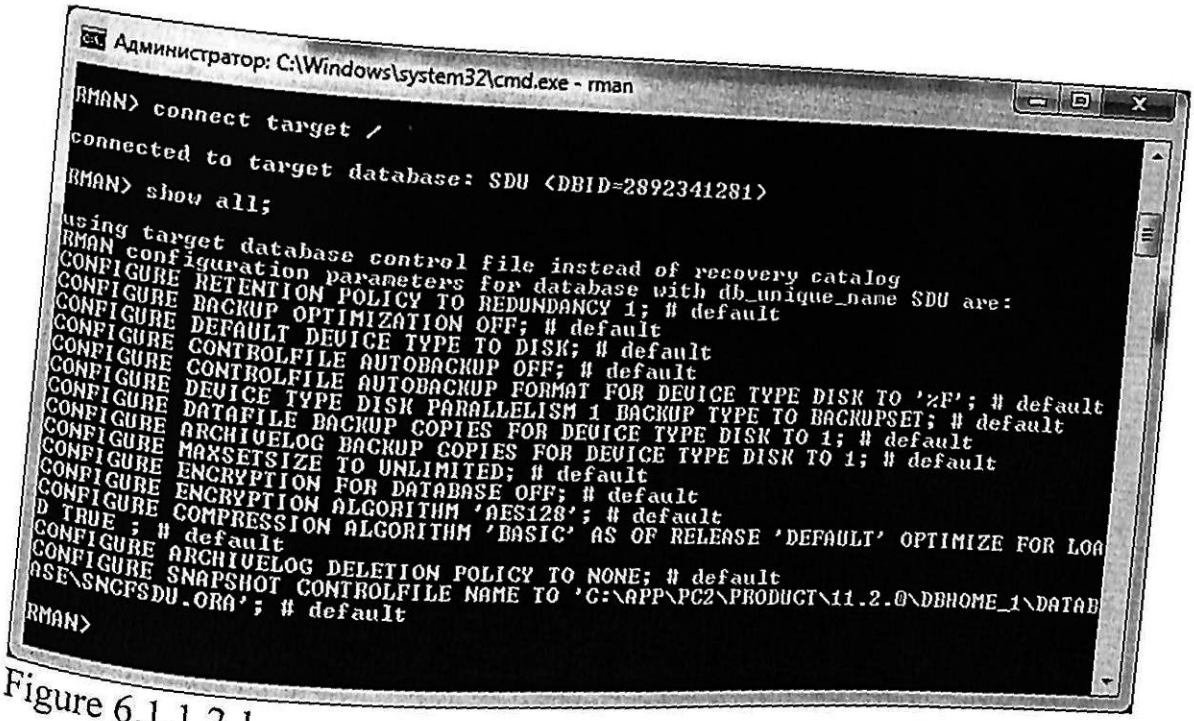


Figure 6.1.1.2.1.

If you want to see only one parameter type: show retention policy;

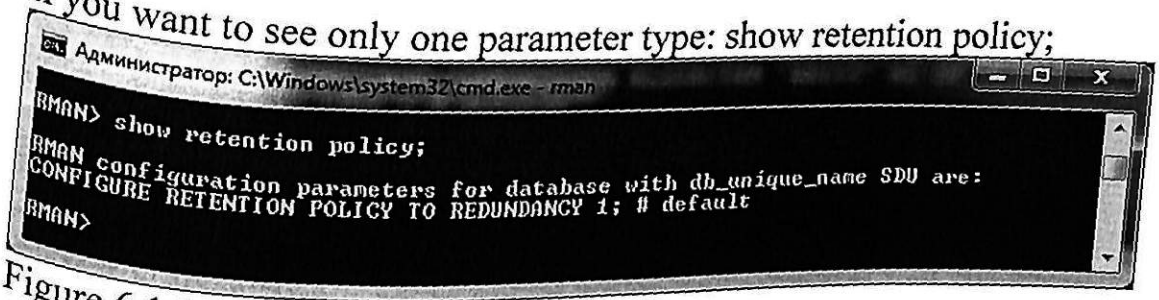


Figure 6.1.1.2.2.

To change a parameter, copy what you see from the SHOW command and change the value accordingly. For example, type: CONFIGURE RETENTION POLICY TO recovery window of 3 days;

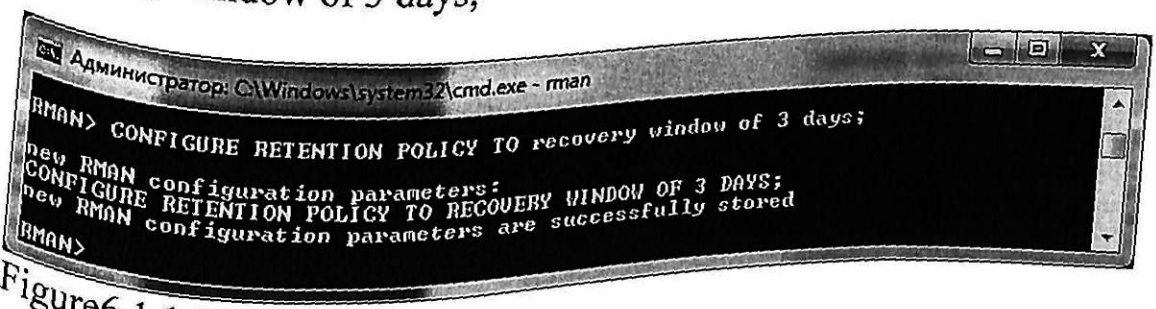


Figure6.1.1.2.3.

6.1.2. *Turn archiving on and off*

Archiving is the database's ability to track all data changes. You can turn archiving on or off.

With archiving off, you can only take backups of the database when it is closed (also called consistent backups). This is done by shutting down that database and starting it

in mount mode. By doing this, no changes are allowed to the data. It allows
take a consistent copy of the data as it exists at that point in time. If you ever h
restore this backup, your database will look exactly as it did when the backu
taken. You can see these inconveniences,

✓ This is unacceptable if your database requires 24/7 availability. You can't just shut it down and disallow changes for as long as your backup takes.

✓ Even if you do consistent backups every day, what happens to the changes that occur between backups? They're lost if you have to restore from a previous backup.

With archiving turned on, you can do the following:

✓ All data changes are tracked.

✓ You can do backups with the database open and available to all users.

✓ If you ever have to restore a backup that was taken the night before, you can appl the archives that were tracked up until the point of failure.

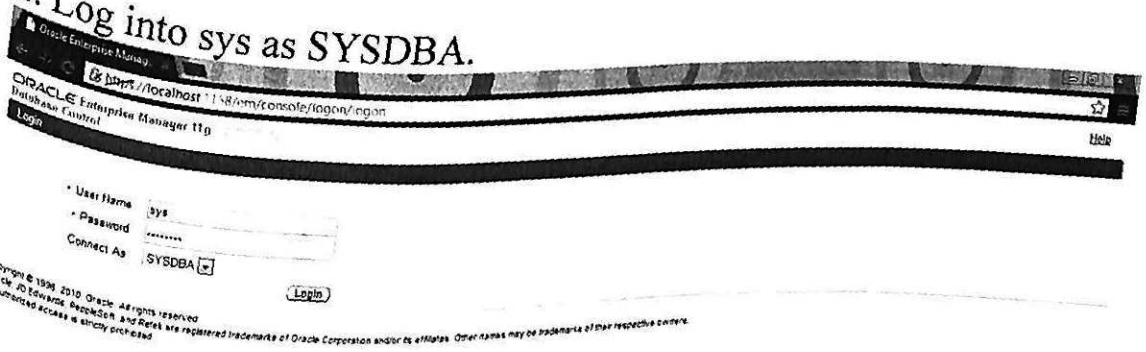
6.1.2.1. Enabling archiving

Before you turn on archiving, decide where to store the archive log files. Use the Flash Recovery Area

6.1.2.1.1. Enabling the Flash Recovery Area

1. Open EM.

2. Log into sys as SYSDBA.



ure 6.1.2.1.1.1.

3. Database Control and click Availability, Recovery Settings

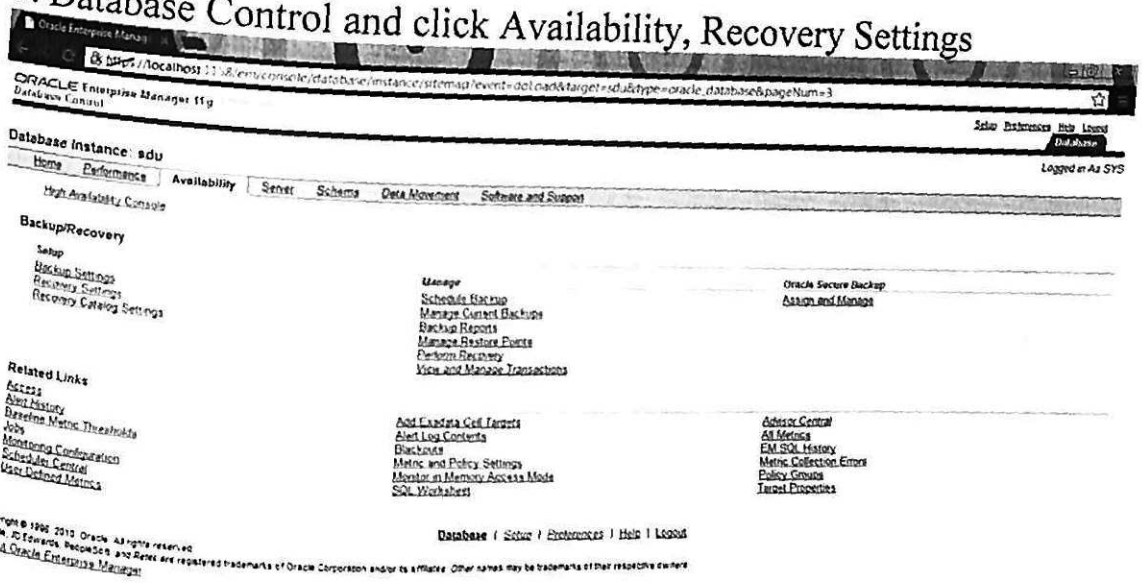


Figure 6.1.2.1.1.2. Enterprise Manager.

4. In the part of Flash Recovery you can change Flash Recovery Area Location and Flash Recovery Area Size

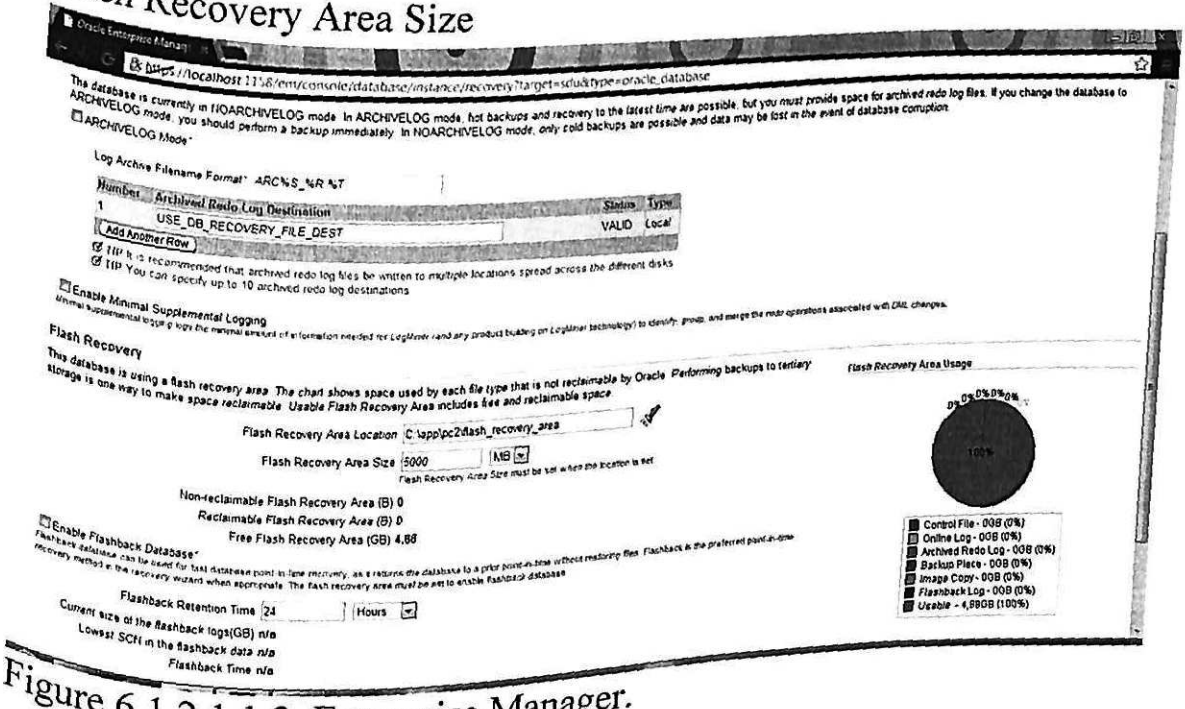


Figure 6.1.2.1.1.3. Enterprise Manager.

After determining where you want to keep the archive logs, you can turn on archiving. The steps walk you through the process:

1. Open a command prompt to your operating system: cmd.

2. Log in to SQL*Plus as SYSDBA: sqlplus / as sysdba

3. Shut down the database: shutdown immediate.

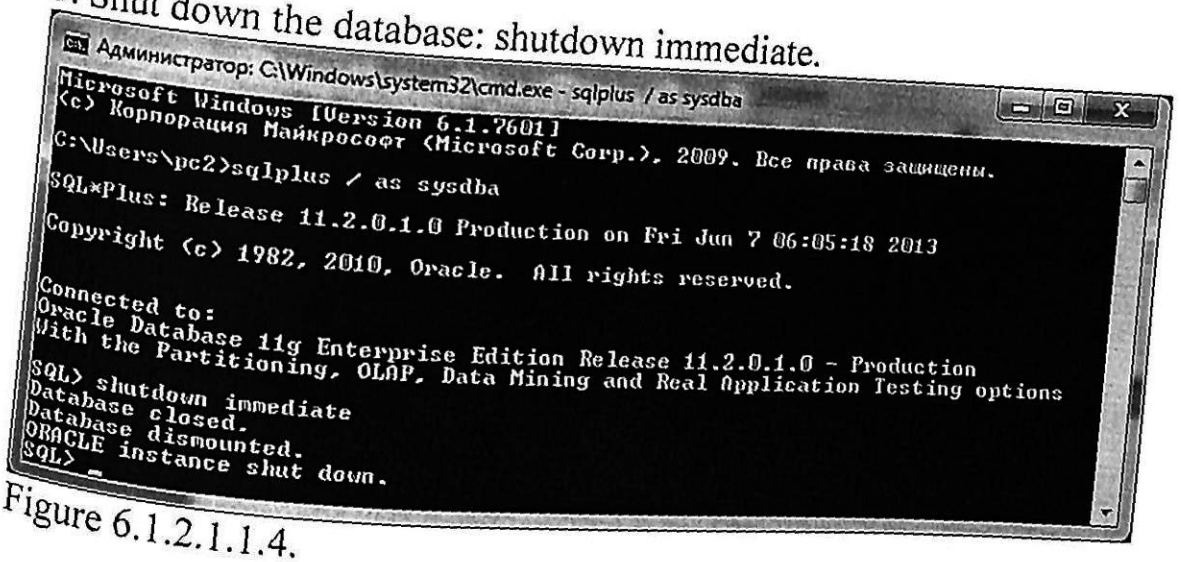


Figure 6.1.2.1.1.4.

4. Start the database in mount mode: startup mount.

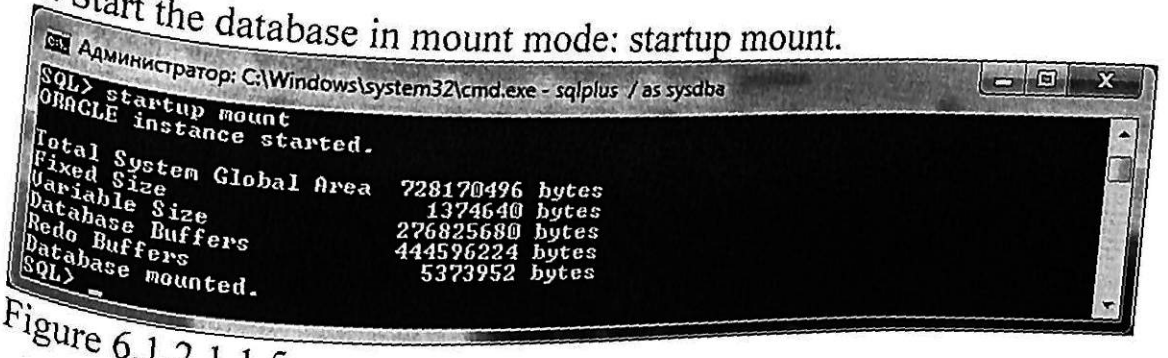


Figure 6.1.2.1.1.5.

5. Issue the command to enable archive mode: alter database archivelog;

6. Open the database: alter database open;

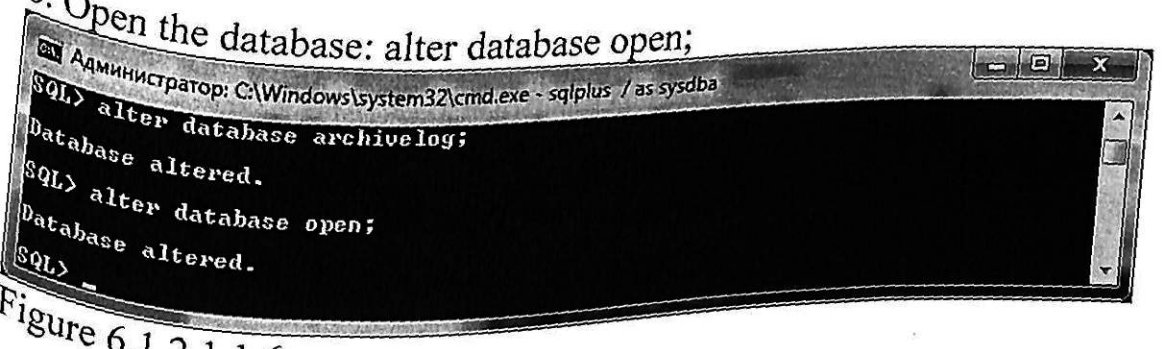


Figure 6.1.2.1.1.6.

Now your database is in archive log mode and archive log files should show up in your flash recovery area.

you are impatient and want to see them now, type the following: alter system chive log current;

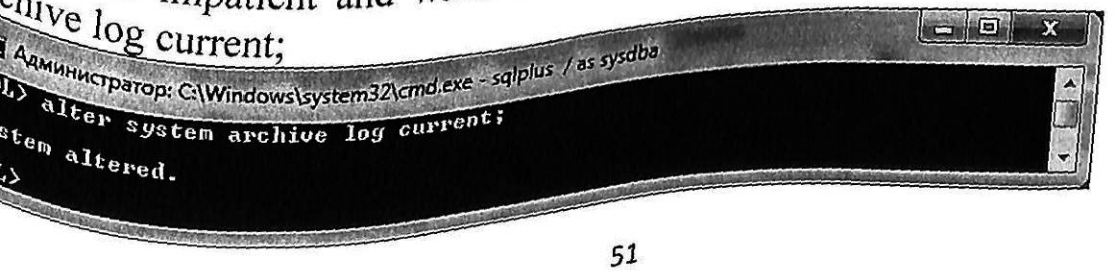


Figure 6.1.2.1.1.7.

And in the location where you mentioned you can see archive log file.

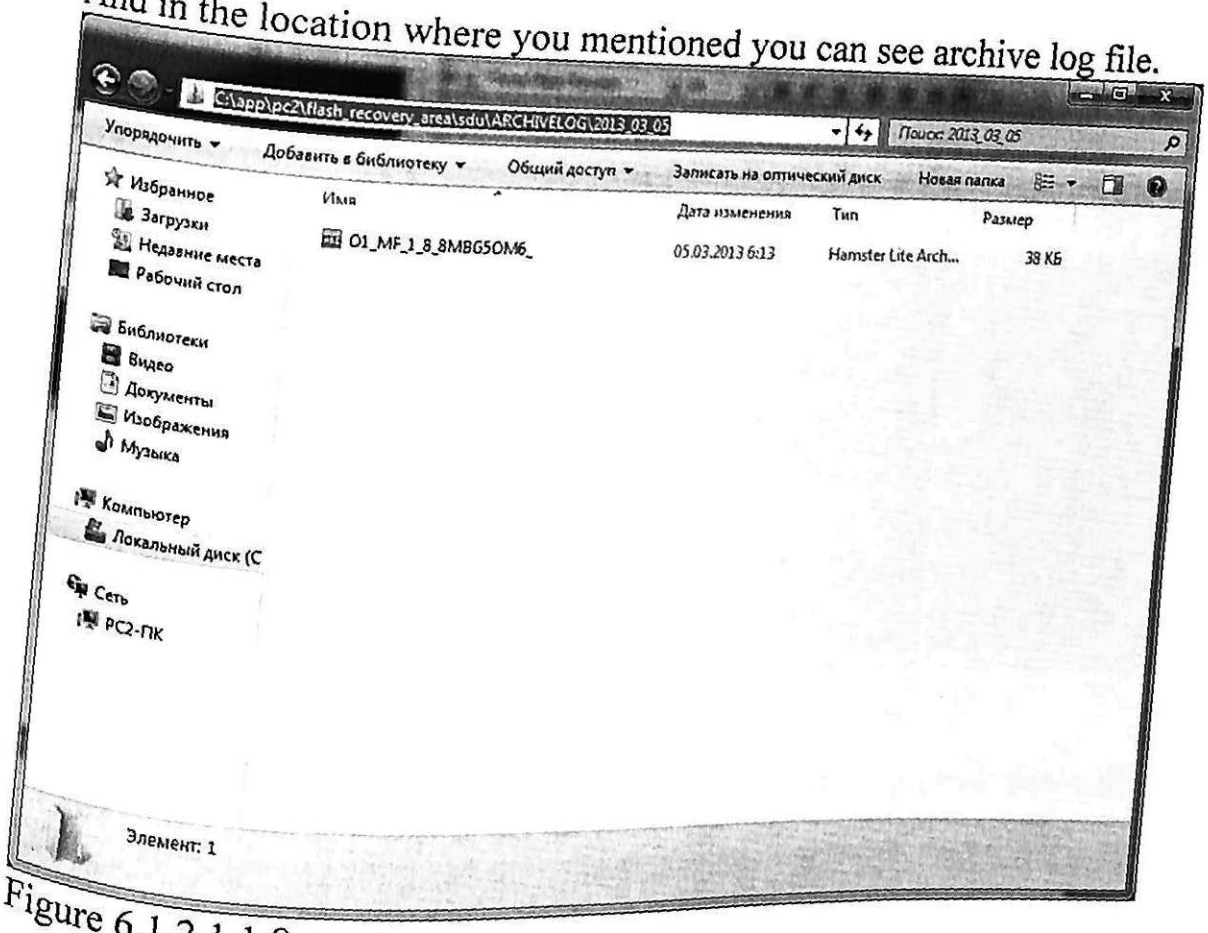


Figure 6.1.2.1.1.8.

6.1.2.2. Disabling Archiving

1. Disable the Flash Recovery Area by EM
2. Shutdown database

Figure 6.1.2.2.1.

3. Edit pfile / spfile (spfile when instance is up of course) to say log_archive_start = false.
4. Than start DB mounted to alter noarchiving, so you can open DB than normally.

startup
alter
alter database open; database m
noarchive

6.1.3. Backing up with backup sets

1. Launch RMAN.

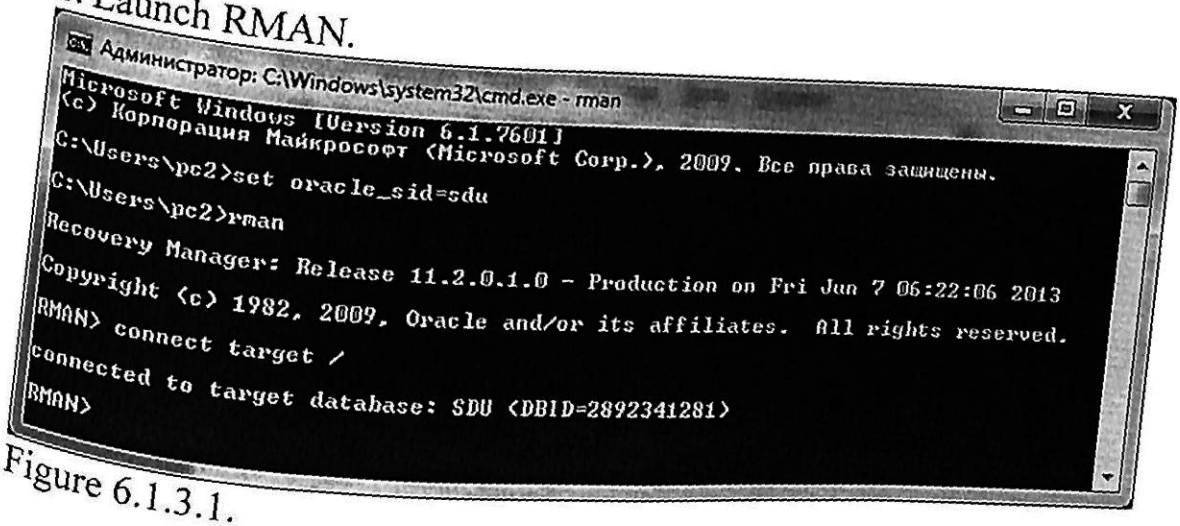


Figure 6.1.3.1.

2. Set your database to automatically back up the control file and spfile: show CONTROLFILE AUTOBACKUP;

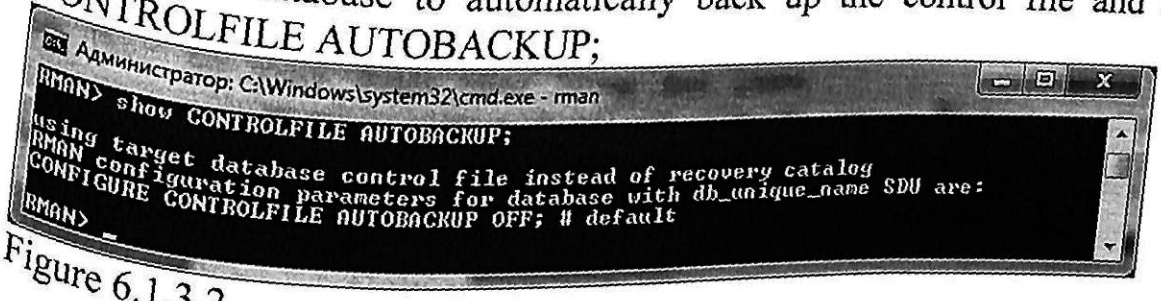
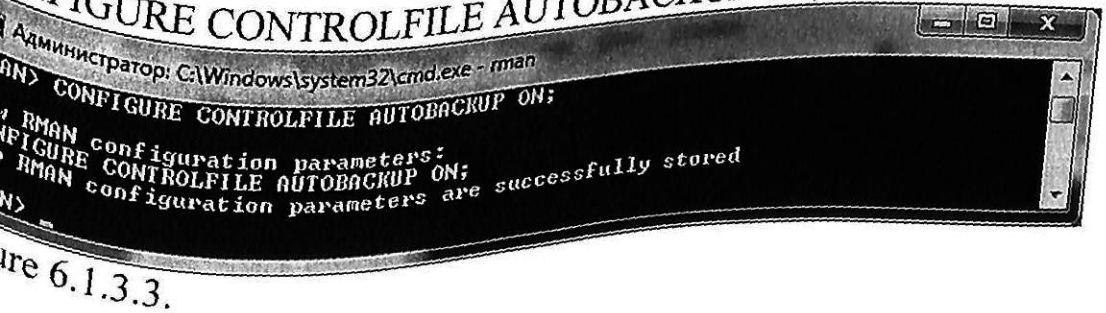


Figure 6.1.3.2.

3. If you see something like this, skip to Step 6:
RMAN configuration parameters for database with db_unique_name SDU are:
CONFIGURE CONTROLFILE AUTOBACKUP ON;

4. If your response reads as follows, go to Step 5.
CONFIGURE CONTROLFILE AUTOBACKUP OFF;

5. Type this:
ONFIGURE CONTROLFILE AUTOBACKUP ON;



re 6.1.3.3.

6. Get a list of the data files in your database: report schema;
You should see something like this

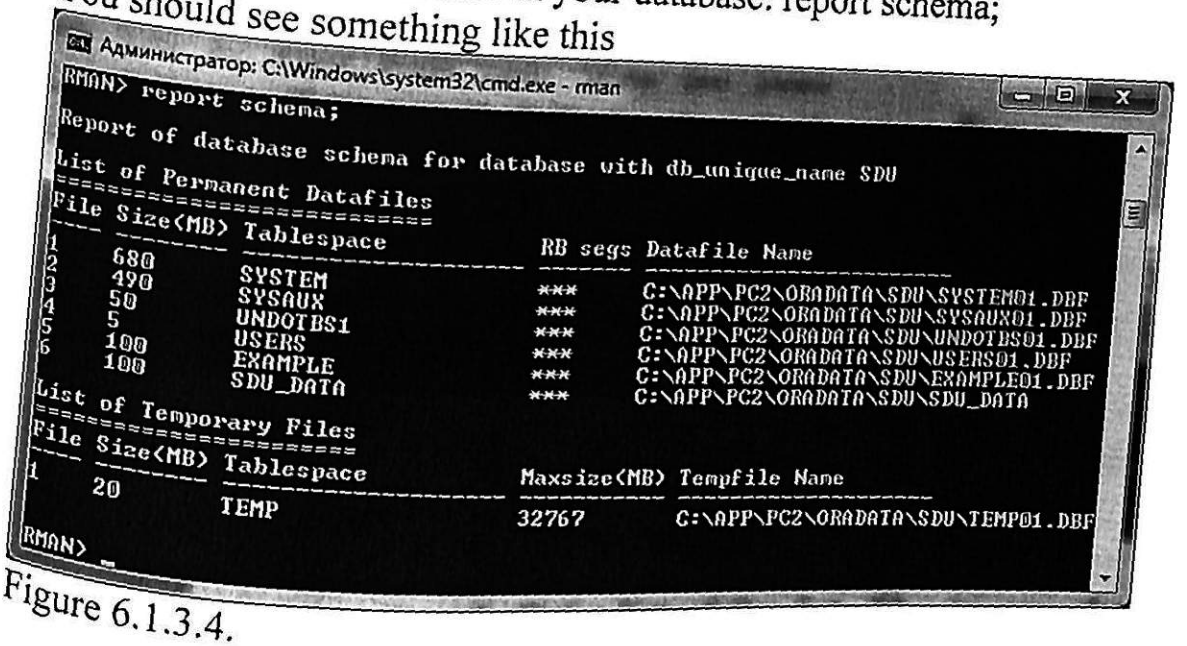


Figure 6.1.3.4.

6.1.4. Backing up the database or tablespaces

Back up the whole database with this: backup database;
You will see output something like this.

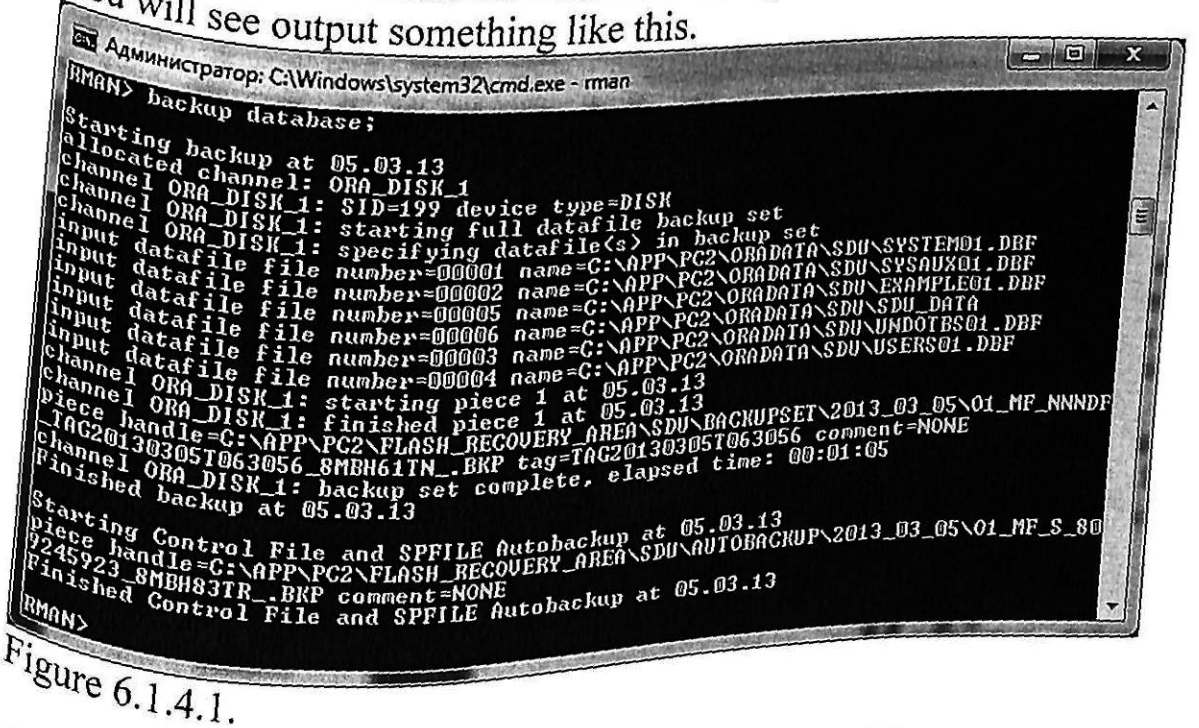


Figure 6.1.4.1.

And also you can backup just one tablespace: backup tablespace users;

Figure 6.1.4.2.

You can name your backups like this: backup database tag=sdu_database_full_backup;

Figure 6.1.4.3.

And all of them are saved in by default path C:\app\pc2\flash_recovery_area\sdu\BACKUPSET\2013_03_05

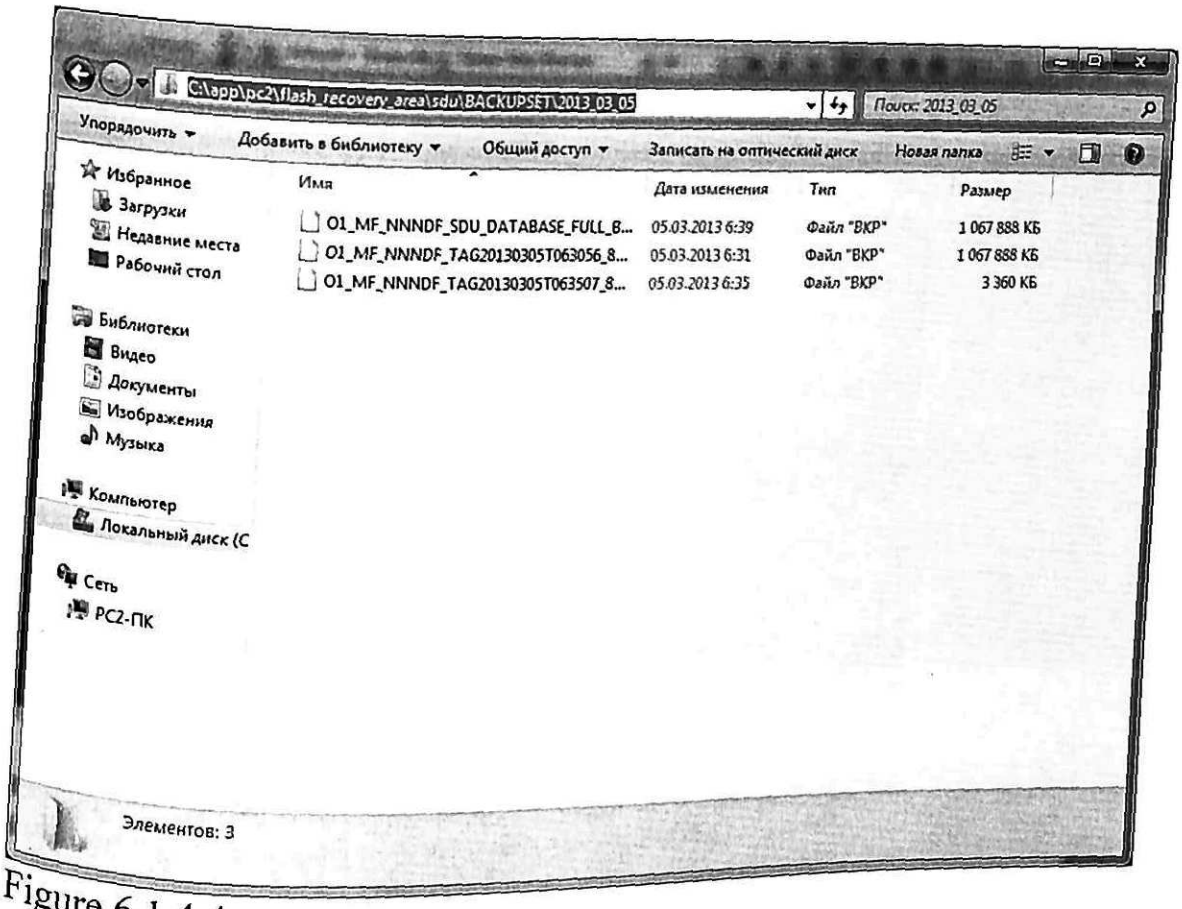


Figure 6.1.4.4.

6.1.5. *Incremental backups*

You may want to consider an incremental backup, which only copies some of the blocks based on when the last incremental was done and what blocks have changed. Incremental backups come in two levels (0 and 1) published in Oracle 11g.

✓ **Differential** only copies blocks that have changed since the last incremental backup of any type. For example, if you do a level-1 differential on Monday and a level-1 differential on Tuesday, the Tuesday backup only gets the blocks changed since the level 1 on Monday.[2]

✓ **Cumulative** gets all blocks that were changed since the last level-0 backup, even if several level-1 differentials were taken since then.[2]

To do the weekly level-0 backup on Sunday, type the following: backup incremental level 0 as compressed backupset database tag=weekly_level_0;

Figure 6.1.5.1.

To do the daily level-1 backup, type the following: backup incremental level 1 as compressed backupset database tag=daily_level_1;

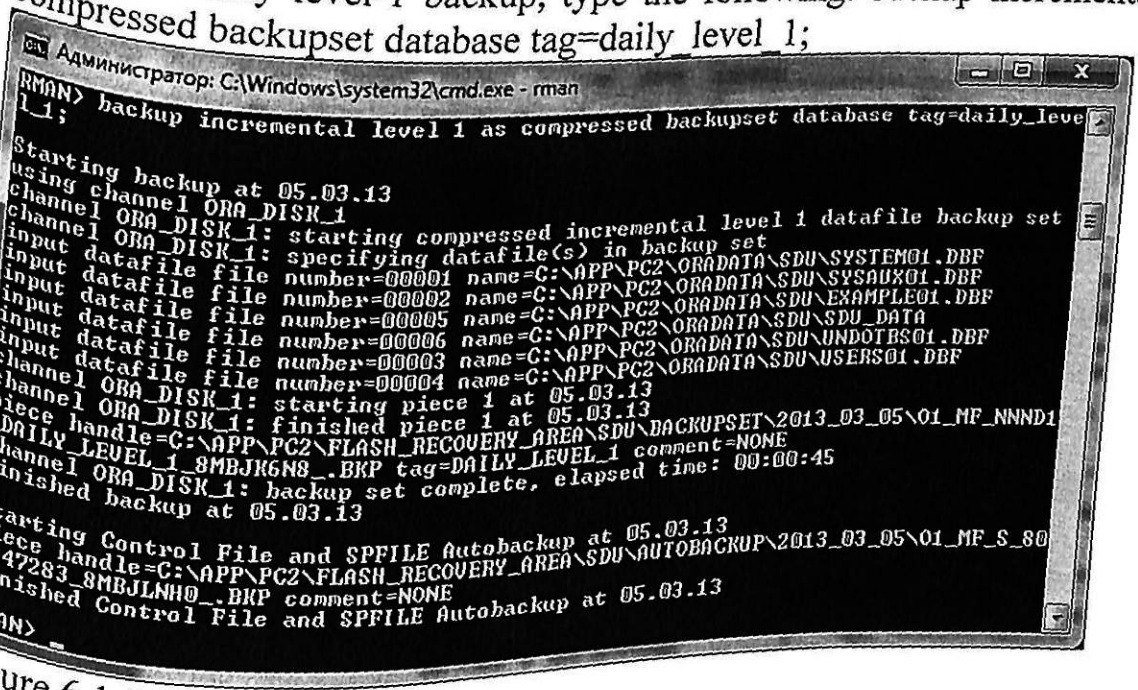


Figure 6.1.5.2.

As you can see I don't have differential backup because I didn't change anything after cumulative backing up, so there is no daily backup here.

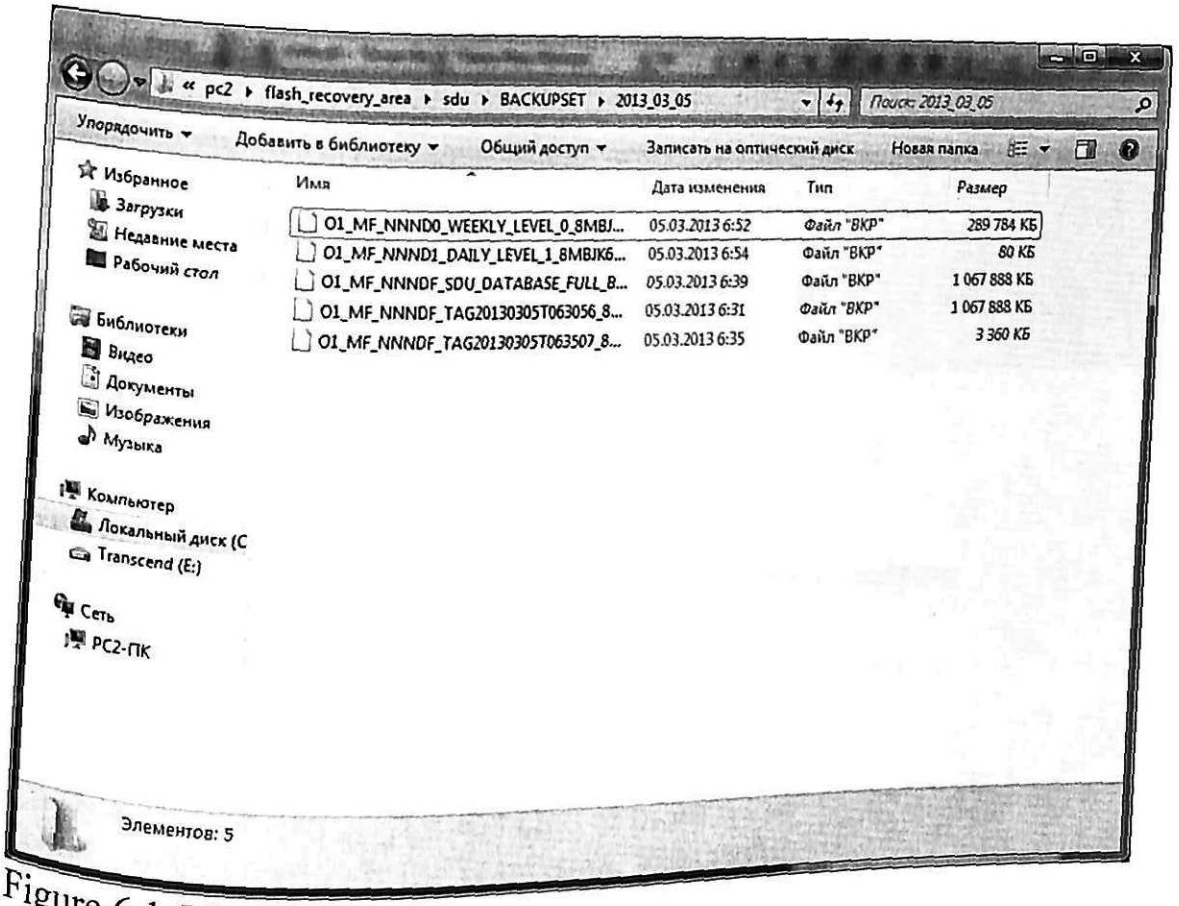


Figure 6.1.5.3.

6.2. *Recover Oracle Database*

There are two types of failures where RMAN can really help:
✓ **Media failure:** Loss of files
✓ **User error:** Mistakes that lead to damaged databases

RMAN can do two types of recoveries:
✓ **Complete:** All files are brought back to the time the database failed. No data is lost.[2]
✓ **Incomplete:** The database is recovered but stopped short of a full recovery. There may be data loss. Sometimes this is what you want. For example, if a user drops a table at 10:13 a.m. sharp, you do an incomplete recovery to 10:12 a.m. to get the database back before the drop occurs.
Complete recovery is what usually happens. However, be prepared for anything.[2]

6.2.1. *Complete recovery: One or more data files*

1. Log into your target with RMAN.

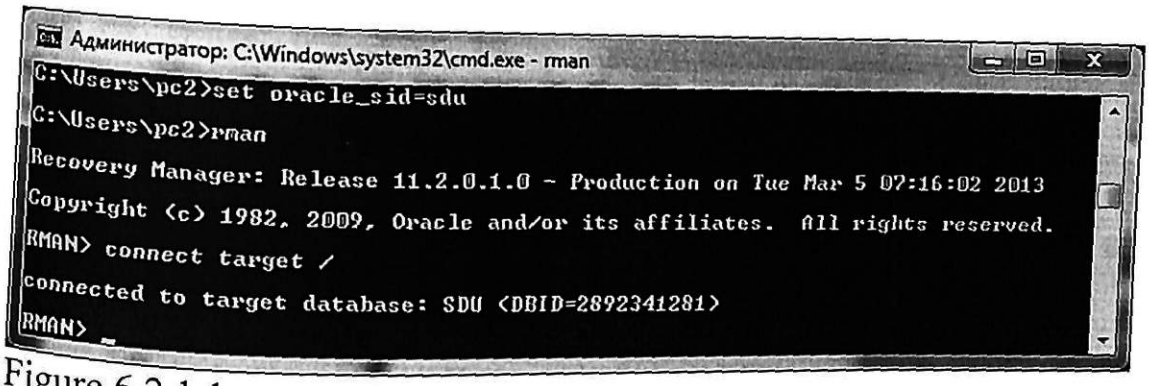


Figure 6.2.1.1.

2. Type this: list failure;
You see something like this:
using target database control file instead of recovery catalog
List of Database Failures

Failure ID Priority Status Time Detected Summary
---------- -------- --------- ------------- -------
1562 HIGH OPEN 11-JUL-08 One or more non-system datafiles are missing
A non-system (critical) file is missing. What to do?

3. Ask the Data Recovery
Advisor (DRA) what to do: advise failure;
You see something like this:
List of Database Failures

Failure ID Priority Status Time Detected Summary
---------- -------- --------- ------------- -------
1562 HIGH OPEN 11-JUL-08 One or more non-system datafiles are missing
analyzing automatic repair options; this may take some time allocated channel:
ORA_DISK_1 channel ORA_DISK_1: SID=155 device type=DISK
analyzing automatic repair options complete Mandatory Manual Actions

no manual actions available
Optional Manual Actions

1. If file /u01/app/oracle/oradata/dev11g/users01.dbf was unintentionally renamed
or moved, restore it
2. If file /u01/app/oracle/oradata/dev11g/example01.dbf was unintentionally renamed
or moved, restore it
Automated Repair Options

Option Repair Description

------ ----------
1 Restore and recover datafile 4; Restore and recover datafile 5
Strategy: The repair includes complete media recovery with no data loss
Repair script:
/u01/app/oracle/diag/rdbms/dev11g/dev11g/hm/reco_727637560.hm

Get a load of that! Not only does the DRA tell you exactly what you need to do, it provides a script so you don't have to write a single line of code.
If you open that script, it looks something like this:
restore and recover datafile
restore datafile 4, 5;
recover datafile 4, 5;

4. Type the following to have the DRA fix the problem: repair failure;
You see something like this:
Strategy: The repair includes complete media recovery with no data loss
Repair script:
/u01/app/oracle/diag/rdbms/dev11g/dev11g/hm/reco_2784523833.hm
contents of repair script:
restore and recover datafile
restore datafile 4, 5;
recover datafile 4, 5;
Do you really want to execute the above repair (enter YES or NO)? yes
executing repair script
At the very end, if the database was closed, it asks if you want to open the database.

5. Type YES to open the database; type NO to leave it in a mount state.
Most of the time you will choose YES. You might choose NO if you want to spend more time going over what happened before you release the database back to the users.

6.2.2. *Complete recovery: One or more control files*

What if you manage to lose all your control files and your databases crashes?
Control files are critical system files.
DRA to the rescue:
1. Log into RMAN.

2. List failure.

3. Advise failure.

4. Repair failure.

1. Re-sync all the data files with the recovered control files: recover database;
You see output similar to this:
Starting recover at 11-JUL-08
Starting implicit crosscheck backup at 11-JUL-08
allocated channel: ORA_DISK_1
channel ORA_DISK_1: SID=150 device type=DISK
Crosschecked 19 objects
Finished implicit crosscheck backup at 11-JUL-08
Starting implicit crosscheck copy at 11-JUL-08
using channel ORA_DISK_1
Crosschecked 16 objects
Finished implicit crosscheck copy at 11-JUL-08
searching for all files in the recovery area
cataloging files...
cataloging done
starting media recovery
media recovery complete, elapsed time: 00:00:00
Finished recover at 11-JUL-08

2. Open the database yourself: alter database open resetlogs;

6.2.3. Incomplete recovery

1. Shut down the database.

2. Start up the database in mount mode.

3. Set the time for the restore to work off of.

4. Restore the database.

5. Recover the database.

6. Open the database with RESETLOGS.
The control files will not match the data files. You have to re-sync the control files with the data files.

7. Open a prompt to your OS command line.

8. Log into your database with RMAN: rman target /

9. Shut down your database: shutdown immediate

10. Use the following RMAN command to recover your database to the appropriate time (9:45 a.m. in this case):

```
RMAN> run {
set until time =
"to_date('11-JUL-2008:09:45:00','DD-MON-YYYY:HH24:MI:SS')";
restore database;
recover database;
sql "alter database open resetlogs";
}
```

Once the command completes, you should see something like this:

```
executing command: SET until clause
using target database control file instead of recovery catalog
Finished restore at 12-JUL-08
Starting recover at 12-JUL-08
using channel ORA_DISK_1
starting media recovery
...output snipped...
media recovery complete, elapsed time: 00:00:08
Finished recover at 12-JUL-08
sql statement: alter database open resetlogs
```

11. Make sure the table you were trying to recover has indeed been recovered.

7. Flashing Back

Flash back is a Oracle time machine.
You can open the database read only to see if you went back far enough.
Not far enough? So than quickly roll back further.
Too far? Roll forward again.

7.1. Configuring and enabling a flash back

1. Consider how far back you want to be able to flash back. Configure this setti
with the parameter db_flashback_retention_target. The default value is 24 hours (
1,440 minutes). Say you want to be able to flash back up to 48 hours.

2. Log into SQL as SYSDBA and type the following: alter system se
db_flashback_retention_target=2880;

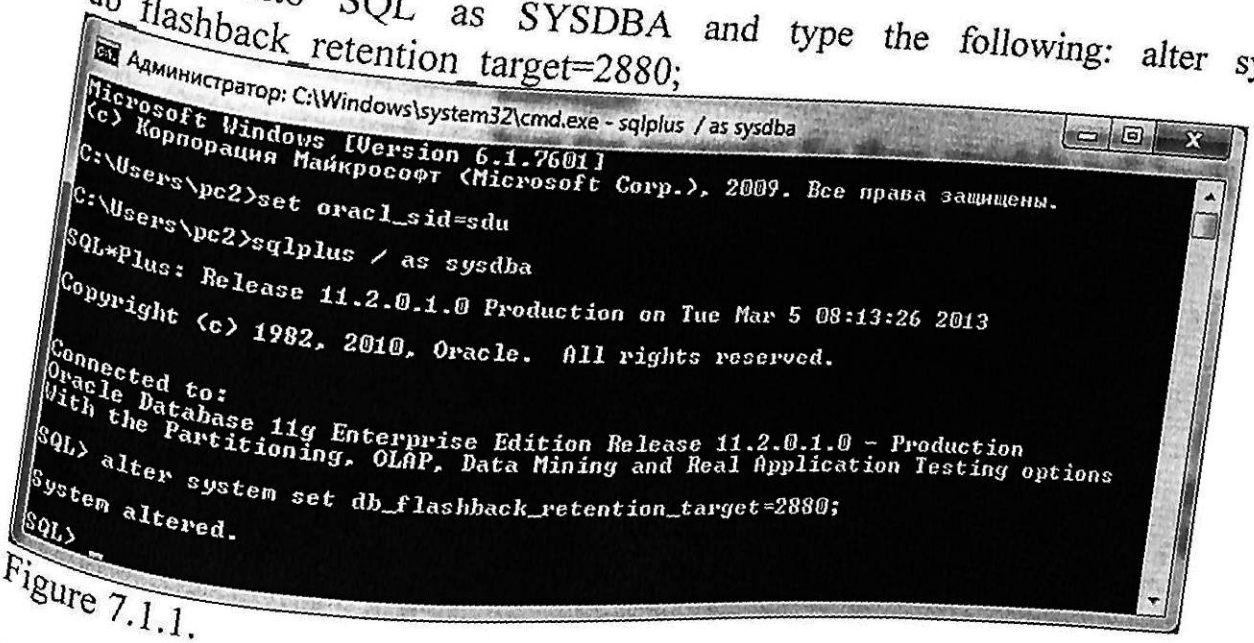
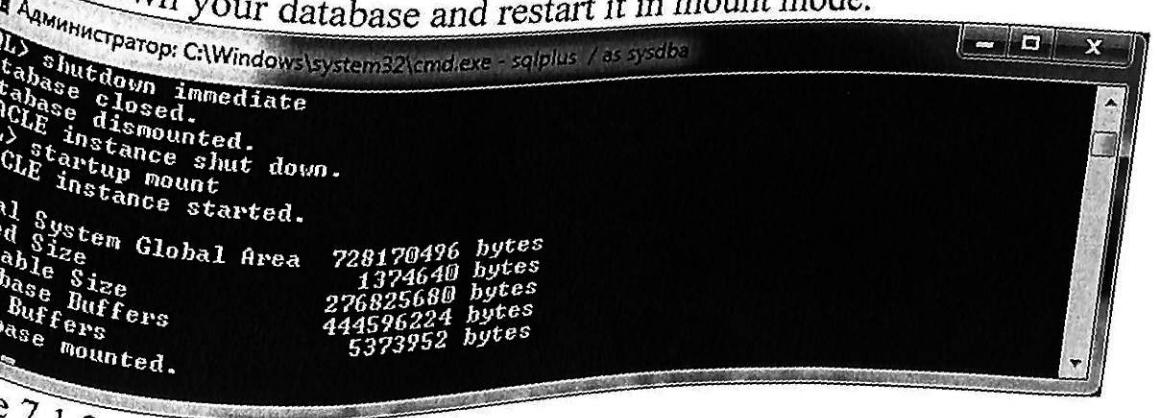


Figure 7.1.1.

You should see the following for any amount of time you choose. In this
example time is set to 2,880 minutes.

Shut down your database and restart it in mount mode.



e 7.1.2.

4. Put the database in flashback mode by typing this: alter database flashback on;

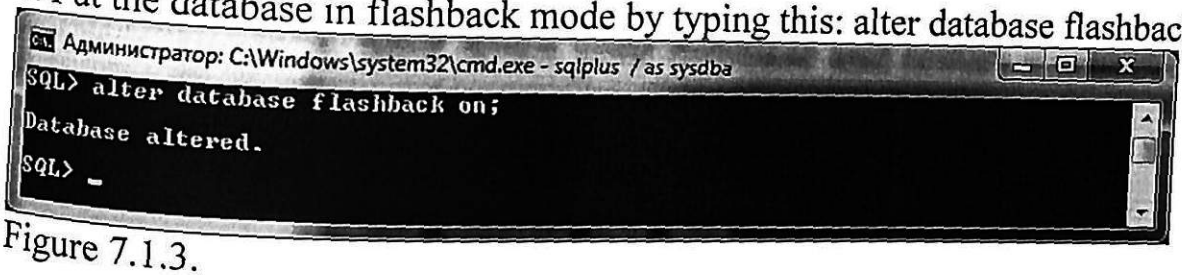


Figure 7.1.3.

5. Open the database by typing this: alter database open;

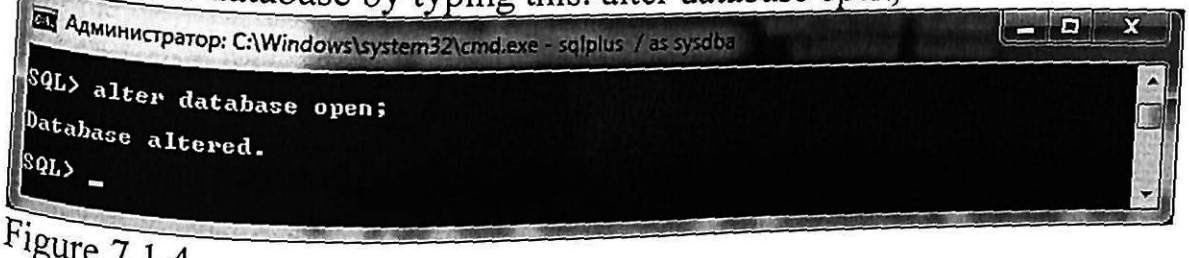


Figure 7.1.4.

Now that the database is in flashback mode, you can flash back to any time within your flashback window.

7.2. Using restore points

To create and name a restore point, follow these steps:
1. Log into the database as SYS.

2. Type the following with your restore point name: create restore point pre_deploy_04MAR2013;
In this example the restore point is called pre_deploy_04MAR2013.

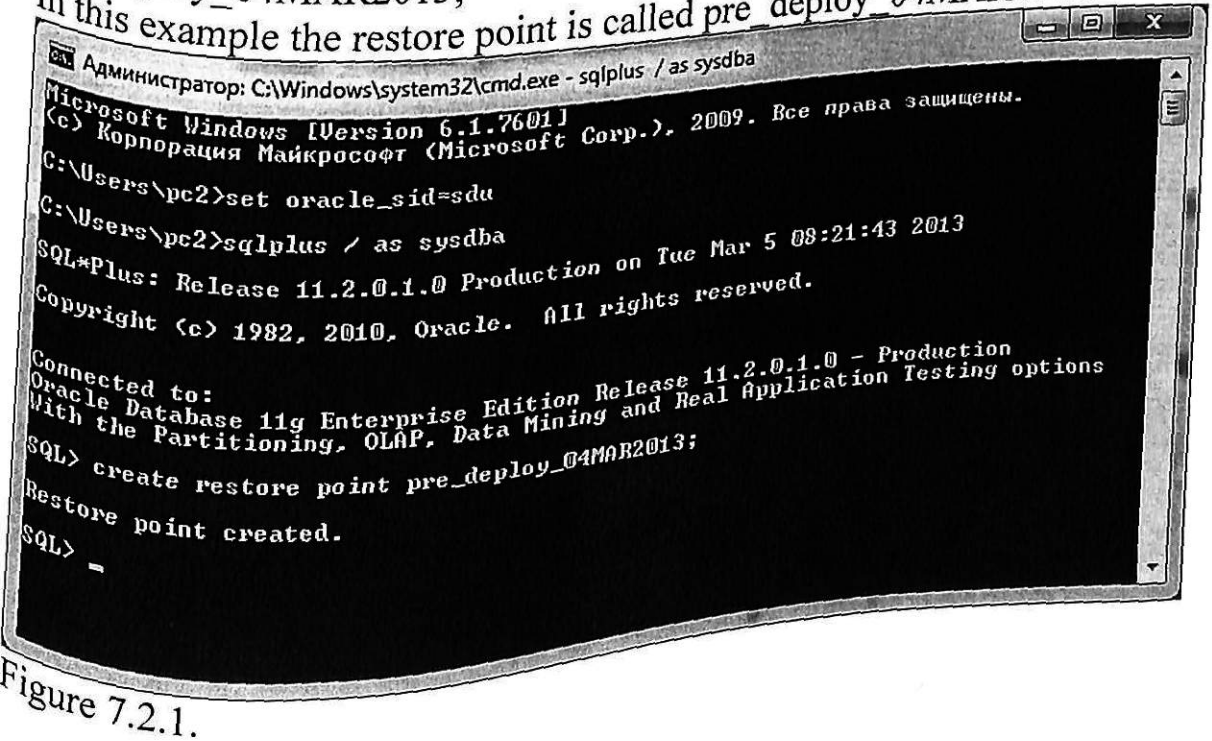


Figure 7.2.1.

Restore points come with a few other handy options:

✓ Get a list of all the restore points you created: select scn, time, name From v$restore_point;

You should see this:

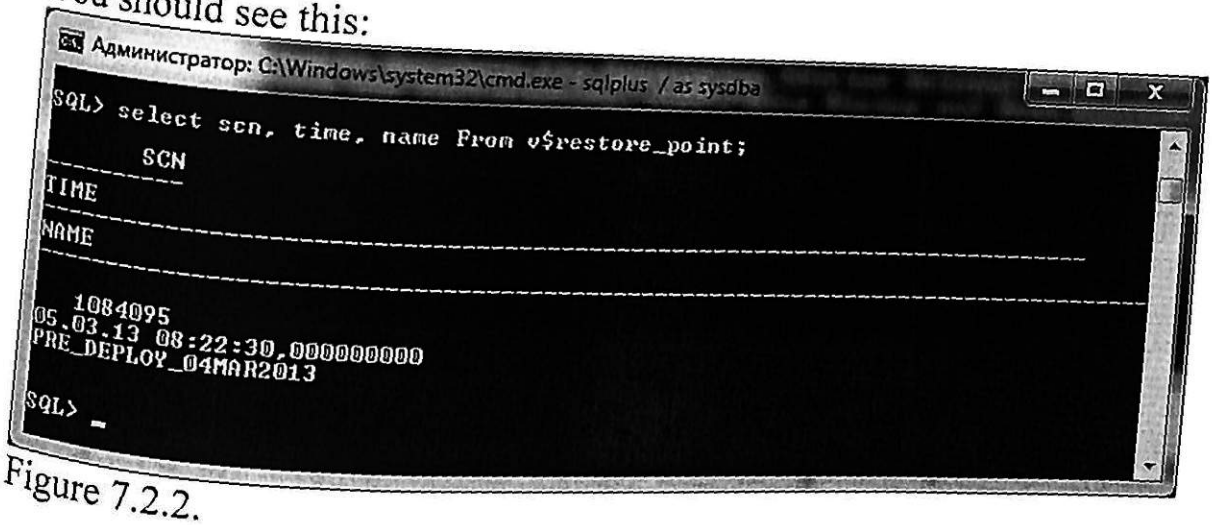


Figure 7.2.2.

✓ Create a restore point that's guaranteed forever. Be careful using that method: Your flashback logs grow until the restore point is dropped.

create restore point pre_deploy_04MAR2013_g guarantee flashback database;

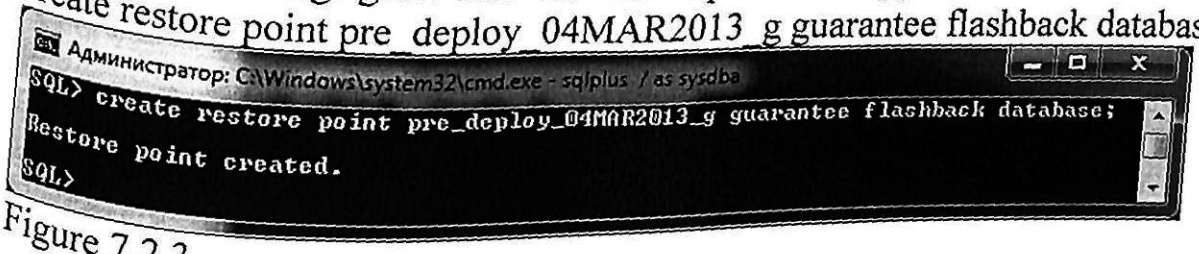


Figure 7.2.3.

✓ Drop the restore point when your code release succeeds:

drop restore point PRE_DEPLOY_04MAR2013;

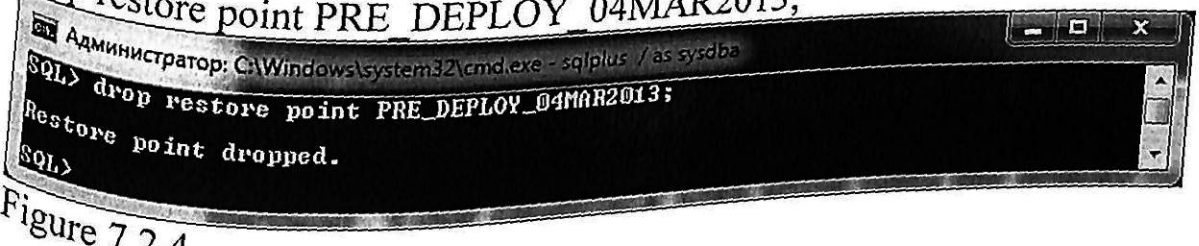


Figure 7.2.4.

7.3. *Flashing back your database*

To start off, say you haven't created any restore points and want to see how far back you can go. Type this: select oldest_flashback_time from v$flashback_database_log;

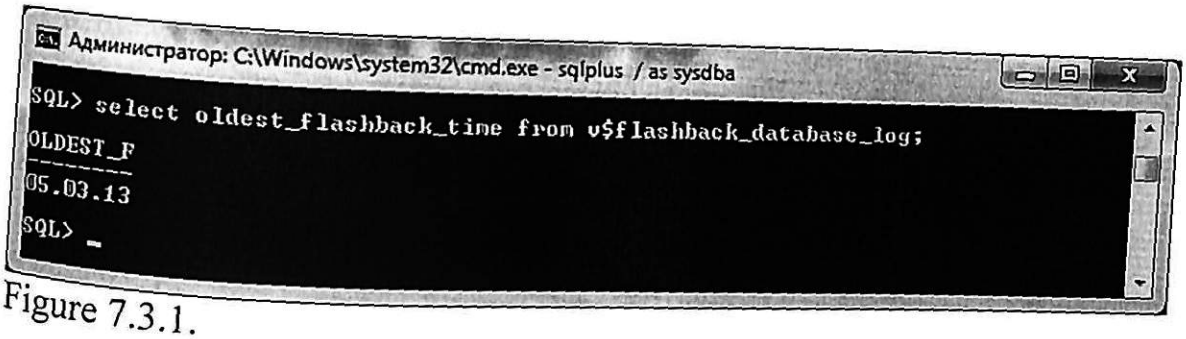


Figure 7.3.1.

Say a user accidentally dropped the STUDENT schema from your database about an hour ago.

1. Shut down your database.

2. Restart it in mount mode.

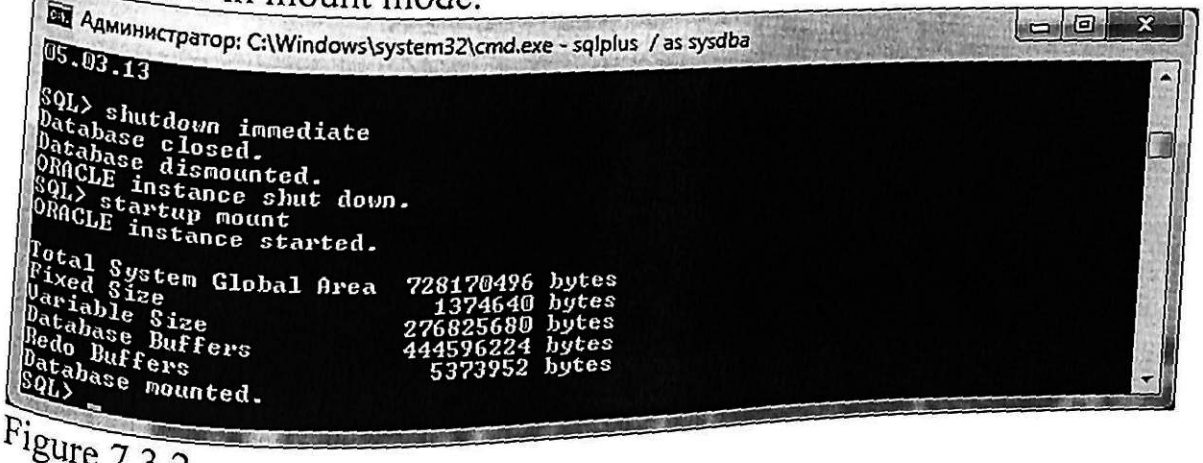


Figure 7.3.2.

3. Type the following, where 1 is the number of hours you want to flash back: flashback database to timestamp sysdate - 1/24;
You should see this:
Flashback complete.

4. Check the flashback before making it permanent: alter database open read only;

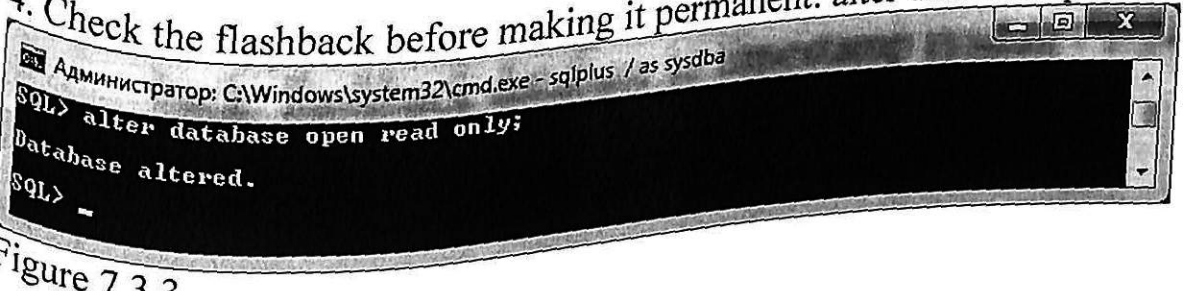


Figure 7.3.3.

. If you're satisfied with the result, go to Step 6. If you're not satisfied with the time, kip to Step 9.

Shut down the database.

7. Start the database in mount mode.

8. Open the database with Resetlogs: alter database open resetlogs;
You should see this:
Database altered.

9. Restart the database in mount mode.

10. Type the following: recover database;
You should see this:
Media recovery complete.

11. Start your database in mount mode.
If you want to flash back to a timestamp, go to Step 12. If you want to flash back to a previously created restore point, go to Step 13.

12. Type the following: flashback database to timestamp to_timestamp('04-MAR-2013 13:00:00','DD-MON-YYYY HH24:MI:SS');
You should see this:
Flashback complete.

13. Type the following if you want to use a restore point:
flashback database to restore point pre_deploy_04MAR2013;
You should see this:
Flashback complete.

8. CONCLUSION

Oracle is a big product, and it is well documented with thousands of pages of documentation. That much documentation can be really hard to find your way though, but Oracle does a nice job of helping you. Oracle documentation comes in the form of books, each written on different subjects. Here as you I have tried choosing main points and collecting them for beginner Database Administrator to work first time job.

I believe that by using this work in less than a day, you can have a complete ready-to-use Oracle database.

In this work I tried to realize really useful material that allows beginner Oracle database administrators to start their work in a first job time. Here of course it starts from installing the Operating system and till managing the data.

Also I preferred to do this work on operating system Windows 7. Because in a nowadays as mentioned before in statistics Windows system is more analedged then other operating systems. And I choused 7 because of it was a last upgraded version while I was doing this work, now of course we get Windows 8 also, but there will not be so differences working on Oracle on both system.

There are a lot of documentations about work of Oracle, so I tried to collect the main points of them to give you enough information to start first weeks.

And I believe that Oracle software will be actual like now, for a long time. So we will need lots of materials like this, because it will give more information in a lack of time.

REFERENCES

1. Oracle 11g For Dummies by Chris Zeis, Chris Ruel, and Michael Wessler
2. Easy Oracle Automation Oracle10g Automatic Storage, Memory and Diagnostic Features, Dr. Arun Kumar R.
3. Oracle 11g R2 Installation Guide By Oracle
4. Введение в Oracle 10g, Перри Джеймс, Пост Джеральд
5. Pro Oracle Database 11g Administration, Darl Kuhn
6. Oracle Care: business metrics for database infrastructure, White Paper, GridwiseTech, 1.10.2012
7. http://docs.oracle.com/cd/B28359_01/server.111/b28310/start001.htm*
8. http://www.cyberforum.ru/oracle/thread466373.html**
9. http://www.youtube.com/watch?v=2Thx4r4elH8*
10. http://www.dba-oracle.com/concepts/computer_interface_concepts.htm**
11. http://gs.statcounter.com/#os-ww-monthly-201202-201302*
12. http://www.netmarketshare.com/report.aspx?qprid=11&qpcustomb=0**
13. http://oracle-teach.ru/*
14. http://books.google.kz/books/about/Beginning_Oracle_Database_11g_Administra.html?id=ufDibgxnCdUC&redir_esc=y*
15. http://docs.oracle.com/html/B13669_01/toc.htm*
16. http://www.oracle.com/webfolder/technetwork/tutorials/obe/db/10g/r2/prod/install/wininst/wininst_otn.htm***
17. http://blog.mclaughlinsoftware.com/2011/12/29/oracle-11gr2-on-windows-7/**
18. http://www.oracle.com/technetwork/articles/sql/11g-security-100258.html***

19.http://www.gridwisetech.com/Oracle-Database-Appliance-specifications****

20.http://www.dba-oracle.com/bk_disable_archive_log_mode.htm**

21.http://docs.oracle.com/cd/B19306_01/backup.102/b14192/setup005.htm***

22.http://www.orafaq.com/wiki/****

23.http://all-oracle.ru/content/view/?part=2&id=77****

*- access on 20.02.13 - 10.03.13
** - access on 20.04.13
***- access on 16.05.13
**** - access on 05.06.13