

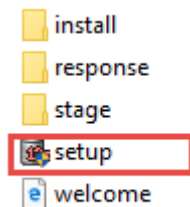
Oracle Workshop - SQL

1) Install Oracle 12c software

To install Oracle database on your computer, you need to download the installer from the [download page](#) of Oracle website.

After having the installation files which are in ZIP format, you need to extract them into a specific folder on your computer.

The following picture shows the structure of the folder of the Oracle installation files after extraction.



Now you need to double-click the setup.exe file to start the installation process. There will be 9 steps which mostly automatically execute.

Step 1. The installer asks you to provide your email address to get the latest security issues and updates. You can ignore it by clicking the Next button

Oracle Database 12c Release 1 Installer - Step 1 of 9

Configure Security Updates

Provide your email address to be informed of security issues, install the product and initiate configuration manager. [View details.](#)

Email:

Easier for you if you use your My Oracle Support email address/username.

☐ I wish to receive security updates via My Oracle Support.

My Oracle Support Password:

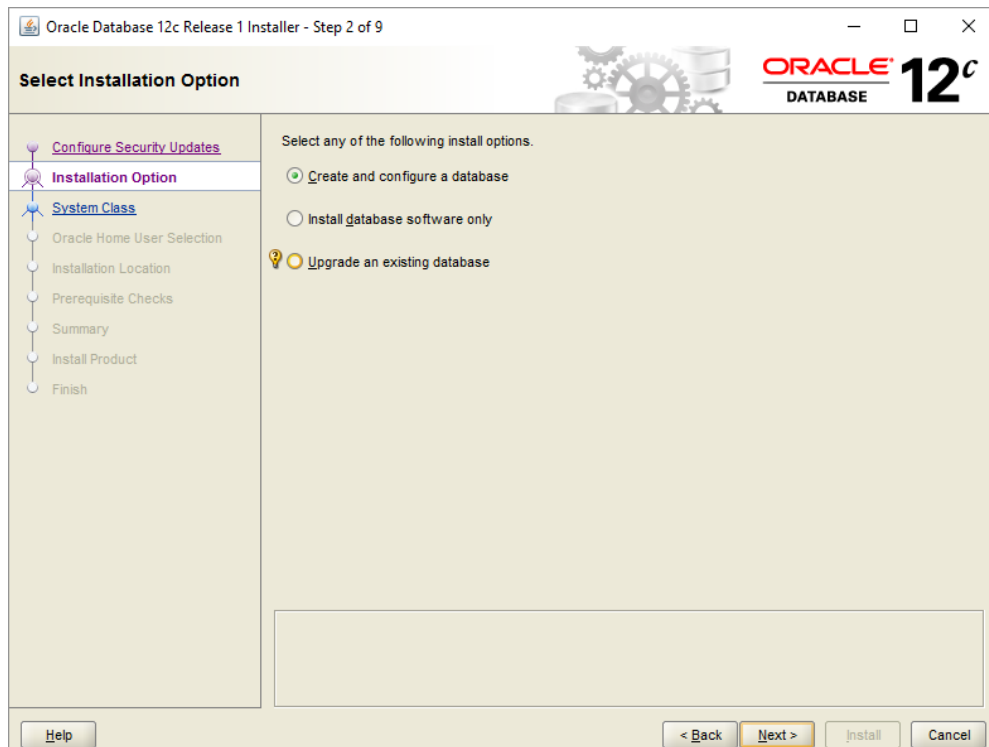
Because I didn't provide the email address, the Oracle database installer confirm it, you just need to click the No button to continue.

My Oracle Support Username/Email Address Not Specified

You have not provided an email address.

Do you wish to remain uninformed of critical security issues in your configuration?

Step 2. In step 2, Oracle installer ask you to whether you want to create and configure a database, install database software only or just upgrade an existing database. Because you install the Oracle database at the first time, choose the option 1 and click the Next button.



Step 3. The installer allows you to choose the system class. Because you install Oracle on your computer, not a server, therefore, you choose the first option: desktop class and click the Next button.



Step 4. This step allows you to specify the Windows user account to install and configure Oracle Home for enhanced security. Choose the third option: "Use Windows Built-in Account".

Oracle Database 12c Release 1 Installer - Step 4 of 9

Specify Oracle Home User

Oracle recommends that you specify a standard Windows User Account (not an Administrator account) to install and configure the Oracle Home for enhanced security. This account is used for running the Windows Services for the Oracle Home. Do not log in using this account to perform administrative tasks.

☐ Use Existing Windows User
 User Name:
 Password:

☐ Create New Windows User
 User Name:
 Password:
 Confirm Password:
 The newly created user is denied Windows logon privileges.

☒ Use Windows Built-in Account

Help < Back Next > Install Cancel

Step 5. in this step you can (1) choose the folder on which Oracle database will be installed, (2) Global database name and password, (3) pluggable database name.

Oracle Database 12c Release 1 Installer - Step 5 of 9

Typical Install Configuration

Perform full database installation with basic configuration.

1 Oracle base: Browse...
 Software location: Browse...
 Database file location: Browse...

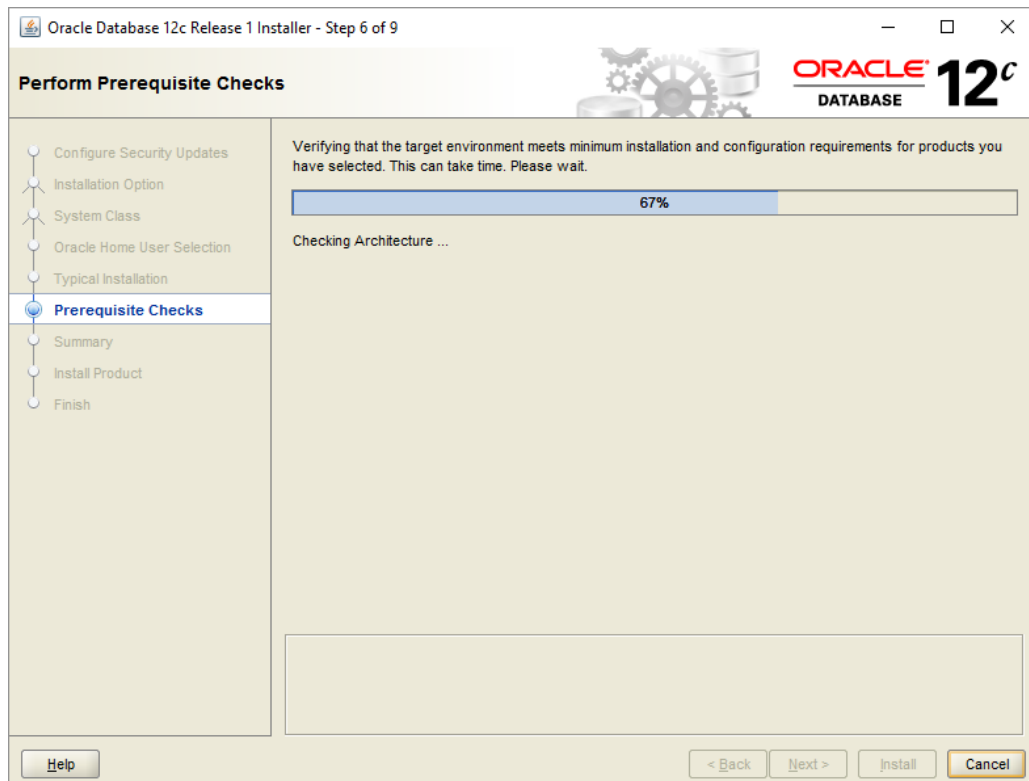
Database edition: Enterprise Edition (6.0GB)
 Character set: Default (WE8MSWIN1252)

2 Global database name:
 Administrative password:
 Confirm password:

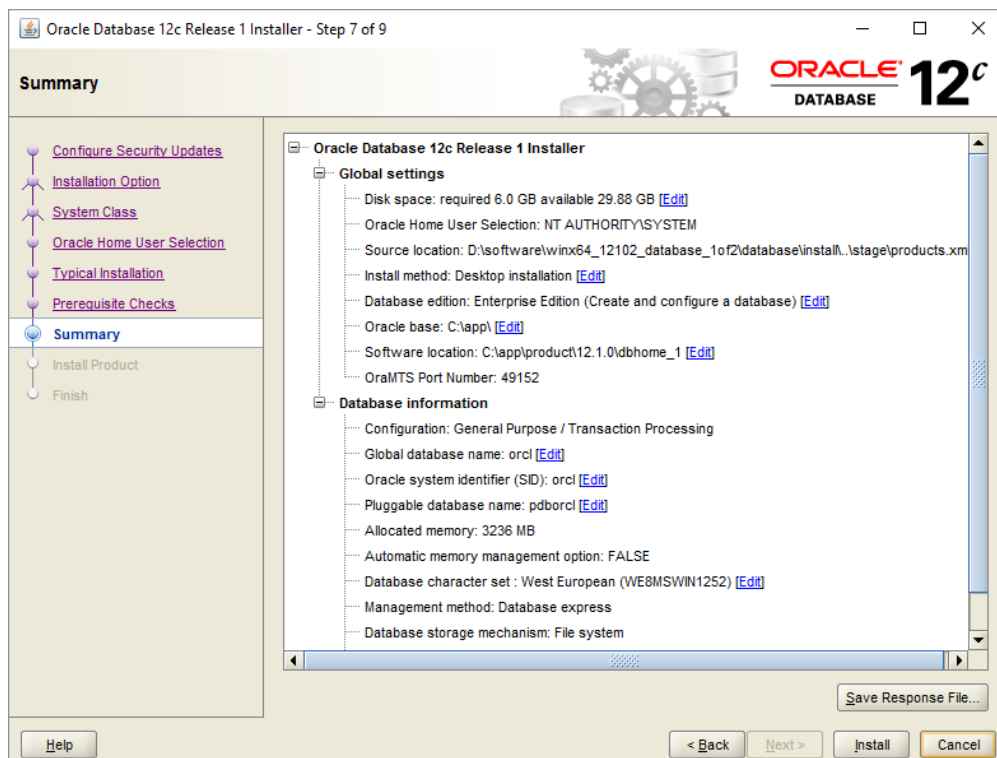
☒ Create as Container database
 3 Pluggable database name:

Help < Back Next > Install Cancel

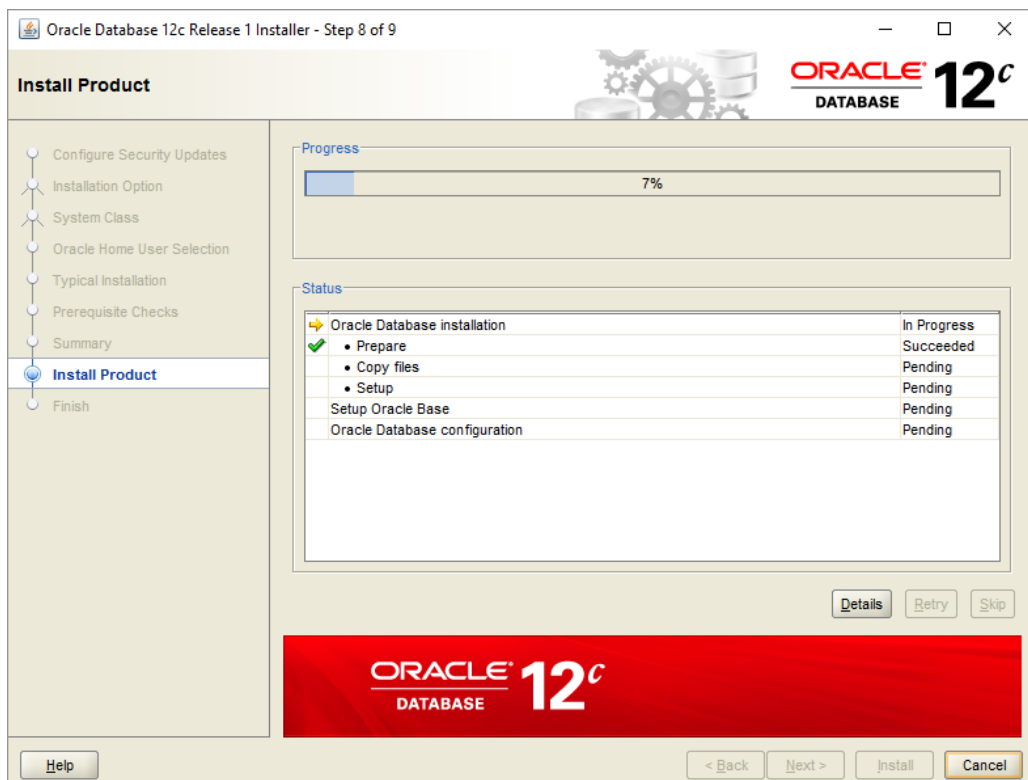
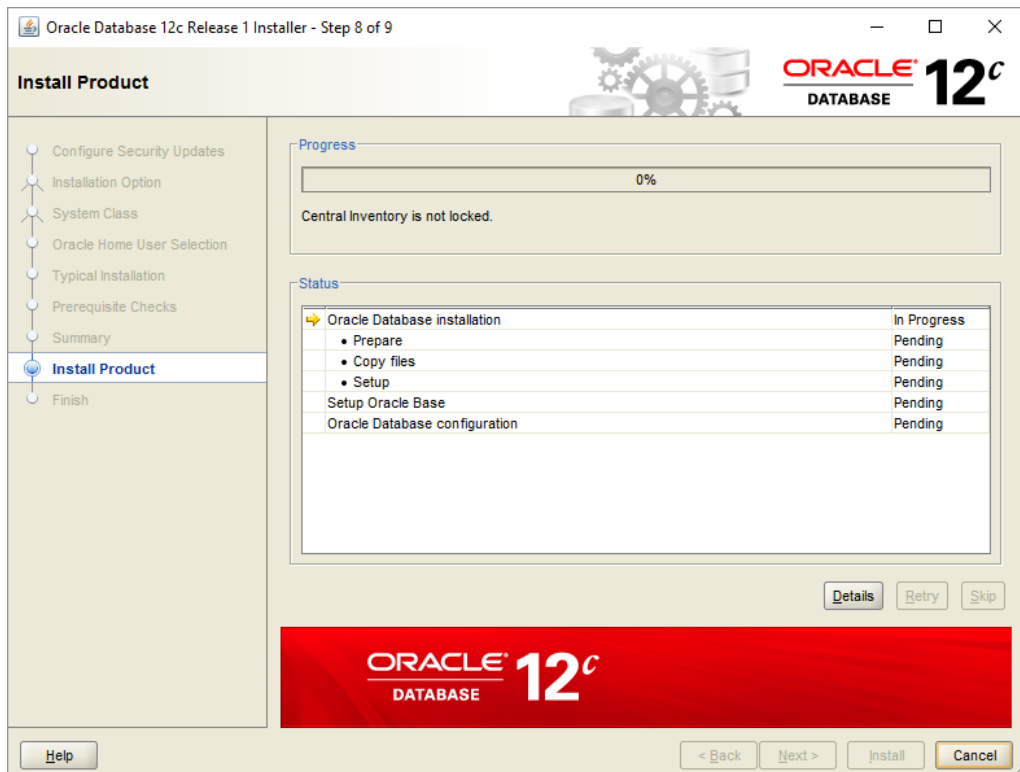
Step 6. The installer performs the prerequisite check.

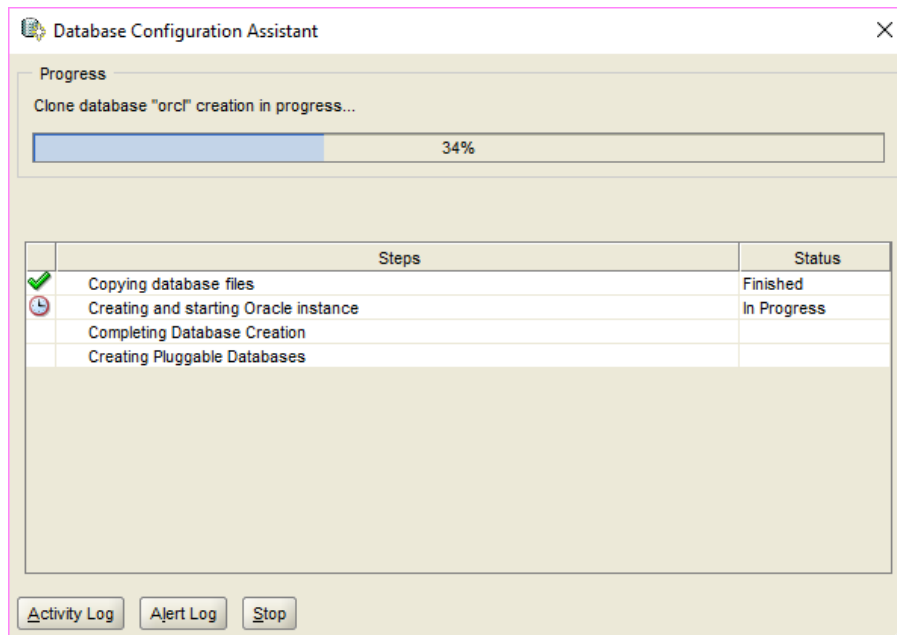


Step 7. The installer shows you the summary of the information such as global settings, database information, etc. You need to review the information and click the install button if everything is fine.

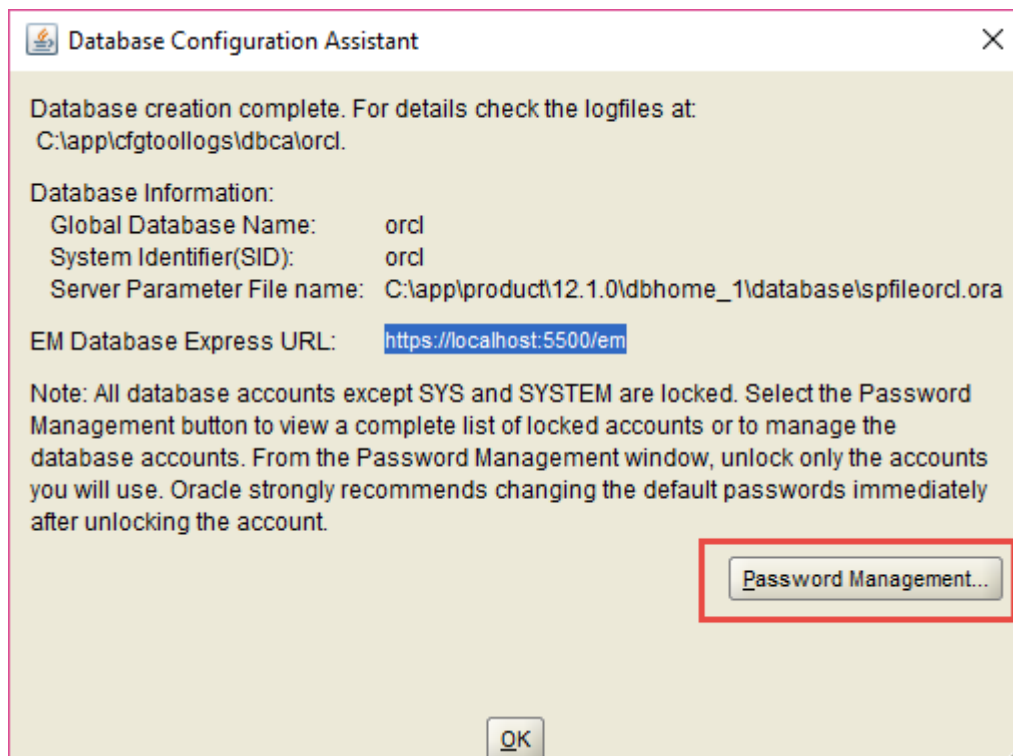


Step 8. The installer starts installing Oracle database. It will take a few minutes to complete, depending on your computer.





You will see the Database Configuration Assistant window. Click the *Password management...* button to enter the password for Oracle database accounts.



Enter the password for SYS and SYSTEM accounts and then click OK button.

Password Management

Lock / unlock database user accounts and / or change the default passwords:

User Name	Lock Account? ▲	New Password	Confirm Password
SYS			
SYSTEM			
AUDSYS	✓		
GSMUSER	✓		
SPATIAL_WFS_ADMIN_USR	✓		
SPATIAL_CSW_ADMIN_USR	✓		
APEX_PUBLIC_USER	✓		
SYSDG	✓		
DIP	✓		
SYSBACKUP	✓		
MDDATA	✓		
GSMCATUSER	✓		
SYSKM	✓		
ORACLE_OCM	✓		
OLAPSYS	✓		
SI_INFORMTN_SCHEMA	✓		

OK Cancel

Step 9. Once installation completes successfully, the installer will inform you as shown in the following screenshot. Click the Close button to close the window.

Oracle Database 12c Release 1 Installer - Step 9 of 9

Finish

The installation of Oracle Database was successful.

Note:

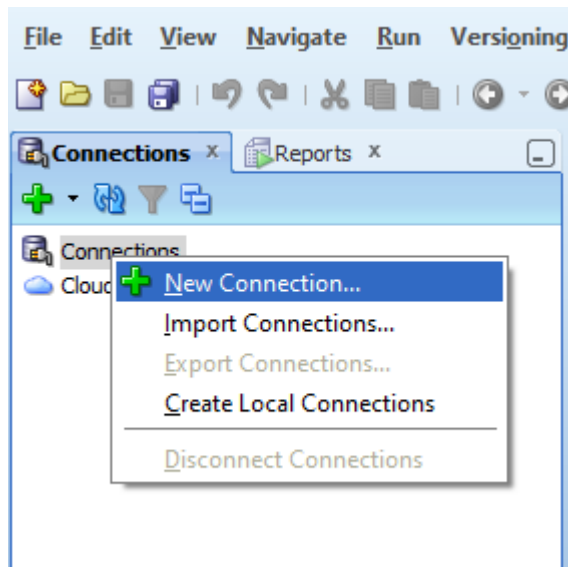
Your database configuration files have been installed in C:\app while other components selected for installation have been installed in C:\app\product\12.1.0\dbhome_1. Be cautious not to accidentally delete these configuration files.

Help < Back Next > Install Close

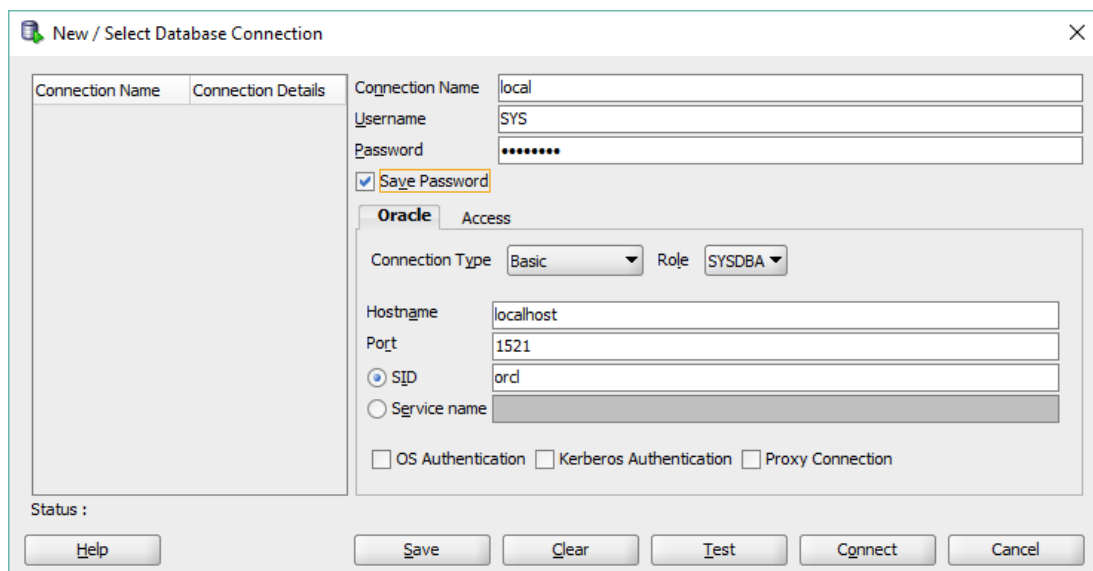
2) Connecting to Oracle Database

First, launch the SQL developer application provided by the Oracle Database.

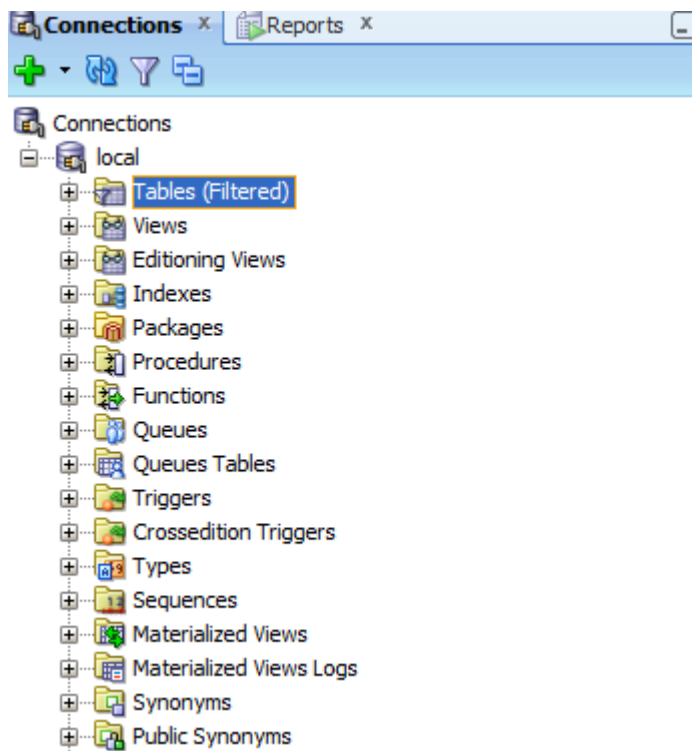
Second, right-click the connections node and choose **New Connection ...** menu item to create a new connection.



Third, enter the information that you provided during the installation process as shown in the following screenshot. Click the Connect button to connect to the Oracle Database.



SQL developer will display all objects as shown below.

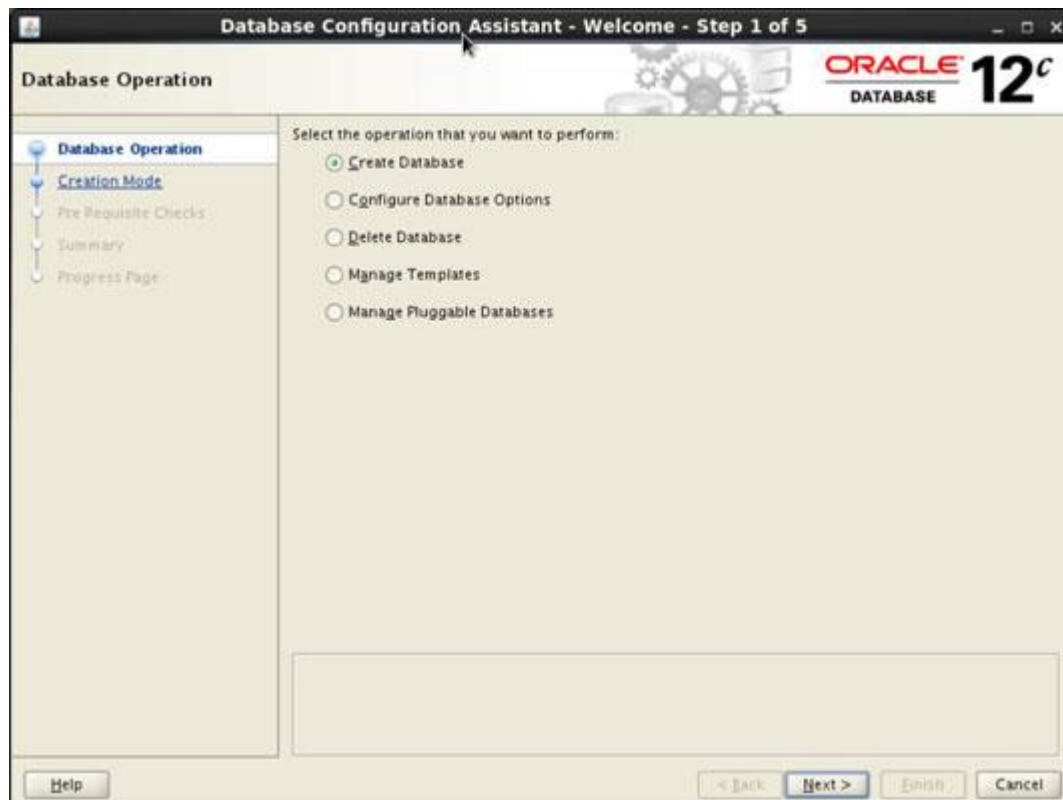


Congratulation! you have installed Oracle Database 12c successfully. Let's start exploring Oracle.

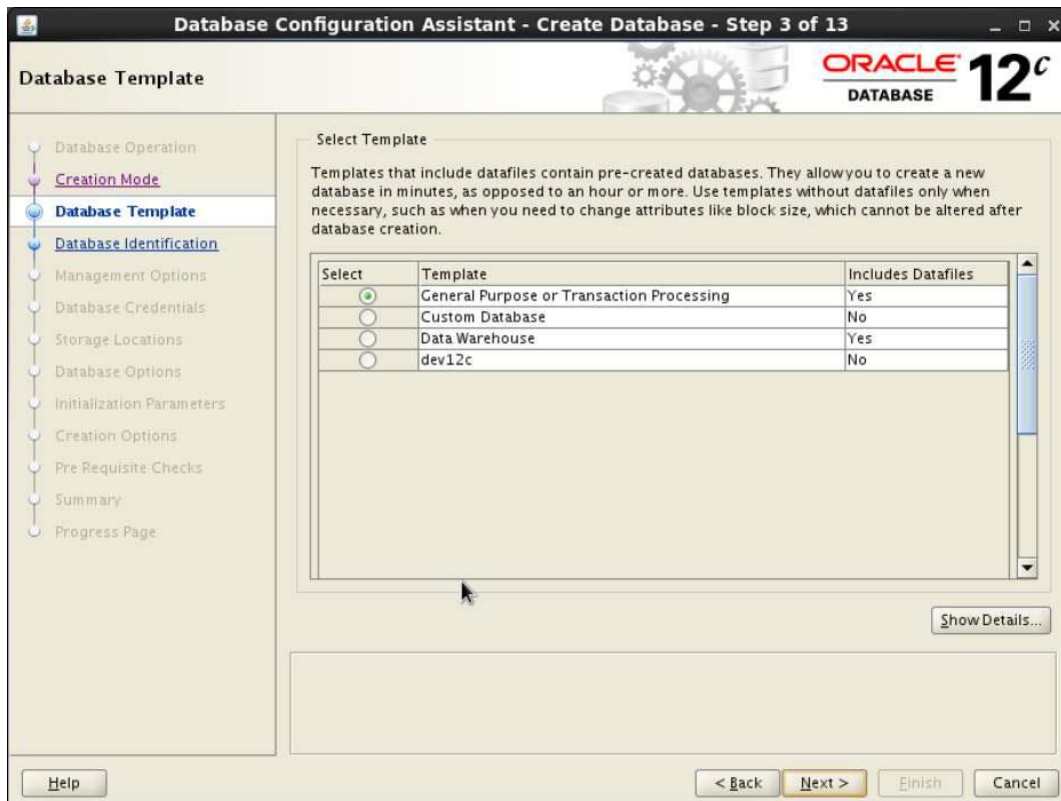
3) Create a new Oracle Database

- Log in as the Oracle software owner.
- Go to a command prompt.
- Type dbca.

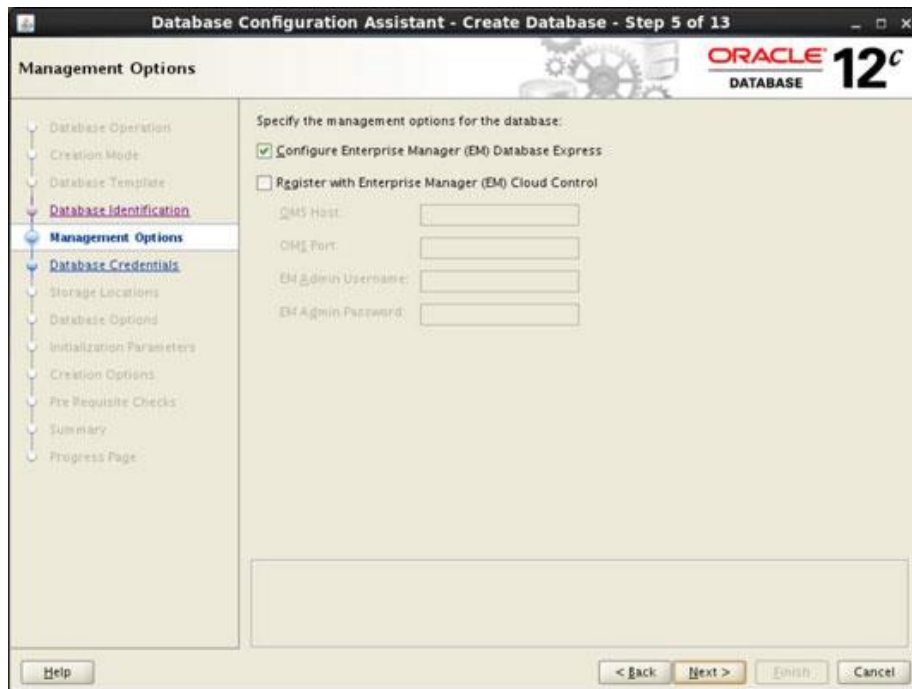
You see a splash screen and another screen with options.



- Select the Create a Database option.
- You are presented with the option of using a default configuration or an advanced one.
- Select the Advanced option.
- Click Next.
- You'll see output. Optional database templates are shown:
 - General Purpose
 - Data Warehouse
 - Custom Database
- Select the Custom Database option.

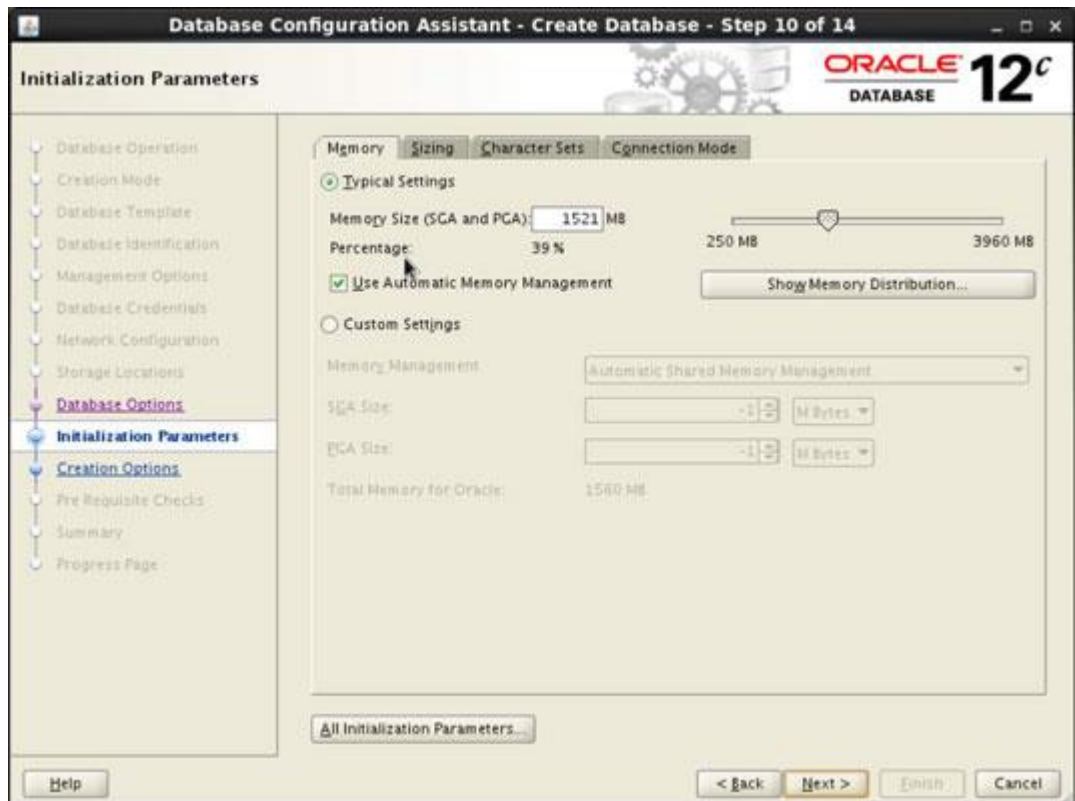


- Click Show Details if you want to see the features, parameters, and files chosen by default for each type of database.
- Click Next.
- A screen asks you to choose the database name.
- Fill in these fields:
 - *Global Database Name:* Your database name with your network domain attached. If you don't want to attach your network domain, leave this field blank.
- 1. *SID:* This is the short name for your database. It equates to your environment variable ORACLE_SID.
- Click Next.
- You're asked whether you want to manage your database with Oracle Enterprise Manager.



- You can configure this two ways:
 1. *Configure Enterprise Manager (EM) Database Express*: Database Express is a management package that runs locally on the database machine and has many of the features of Cloud Control. However, it controls only one database. If you're setting up Oracle on a machine with limited resources, you're going to feel Database Express.
 2. *Register with Enterprise Manager (EM) Cloud Control*: An Oracle software package that typically runs on its own server elsewhere on your network. It can manage many databases, many versions of Oracle, servers, application servers, and even other non-Oracle software, such as Microsoft SQL server, and firewalls.
- Select the Configure Enterprise Manager (EM) Database Express option.
- Click Next to continue.
- Set the database credentials (passwords).
- You have two choices here. You can set the passwords individually for the users that are created with the database or set the same password for all users.
- Click Next.
- You're asked whether you want to register your database with a listener. If you do, choose the correct listener and click Next.
- Select an option for how you want to store your files.
- The screen has a drop-down list for you to select how you want to store your files:

1. *File System*: All your data files are put into formatted drives attached to your computer.
 2. *Automatic Storage Management (ASM)*: Don't choose this now. ASM has some great benefits but isn't as easy to set up as the DBCA leads you to believe.
- Select a place to store your files:
 1. *File Locations from Template*: This option doesn't let you make any changes. Oracle chooses where to put the files.
 2. *Common Location*: This option activates the grayed-out field. You choose type or browse for a location to store the files.
 - Choose File Locations from Template and click Next.
 - The Fast Recovery Area (FRA) is a storage area that resides on disk which can house backups, archive logs files, control files, and redo log files.
 - Choose to configure the FRA.
 - Doing so simplifies the storage of backups and archive log files.
 - Determine what FRA space you have available and increase it accordingly.
 - The default value is about 5GB. This might be okay for the archive log files of small databases. You can resize the FRA anytime without taking down the database.
 - Choose to archive later and click Next.
 - Archiving adds drain on the system while creating the database. It's easy enough to enable later on.
 - Ensure you select sample schemas
 - Click Next.
 - The Memory tab has two options: Typical Settings and Custom Settings.

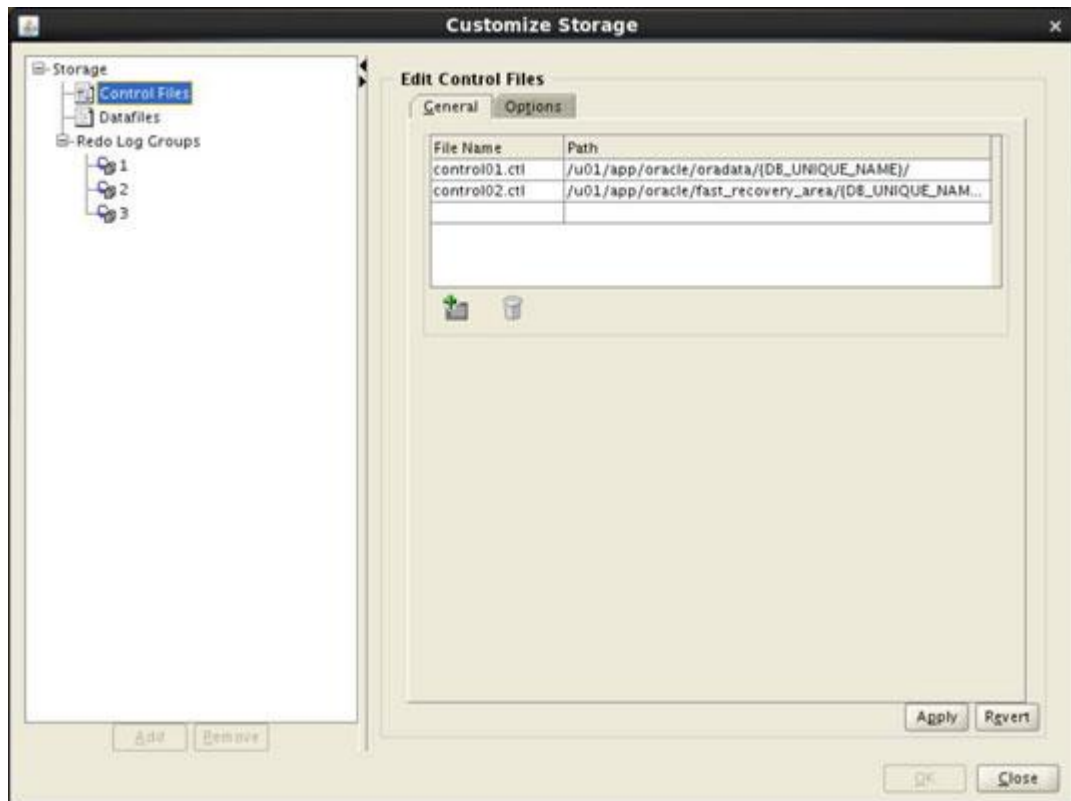


- Select the Typical Settings option.
- Because we're talking Oracle 12c, selecting Typical Settings sets the memory target as one large chunk and lets Oracle figure out where everything goes.
- Click the Sizing tab.
- Select the block size.
- If you get this wrong, your only option is to re-create your database (if the performance problems haven't gotten you fired).
- Click the Character Set tab.
- You can change the character set after creating the database, but it's time consuming and tedious. Select a character set that will house all the characters that your application may use.
- Click the Connection Mode tab.
- You have two options:
 1. Dedicated Server Mode
 2. Shared Server Mode

Name	Value	Override Default	Category
cluster_database	FALSE		Cluster Database
compatible	12.0.0.0.0	✓	Miscellaneous
control_files	C:\u01\app\oracle\oradata\IDB_UN...	✓	File Configuration
db_block_size	8	✓	Cache and I/O
db_create_file_dest			File Configuration
db_create_online_log_dest_1			File Configuration
db_create_online_log_dest_2			File Configuration
db_domain		✓	Database Identification
db_name	dev12d	✓	Database Identification
db_recovery_file_dest	{ORACLE_BASE}\fast_recovery_area	✓	File Configuration
db_recovery_file_dest_size	4800	✓	File Configuration
db_unique_name			Miscellaneous
instance_number	0		Cluster Database
log_archive_dest_1			Archive
log_archive_dest_2			Archive
log_archive_dest_state_1	enable		Archive
log_archive_dest_state_2	enable		Archive
nls_language	AMERICAN		NLS
nls_territory	AMERICA		NLS
open_cursors	300	✓	Cursors and Library ...
pga_aggregate_target	390		Sort, Hash Joins, Bitm ...
processes	300	✓	Processes and Sessions
remote_listener			Network Registration
remote_login_passwordfile	EXCLUSIVE	✓	Security and Auditing
sessions	172		Processes and Sessions

Help Close Show Advanced Parameters Show Description

- Breathe.
- Click the Customize Storage Button to make storage adjustments.
- Now is a good time to make sure the files spread across multiple mount points. Click each menu: Controlfile, Tablespaces, Datafiles, and Redo Log Groups. Change the directories (on the right) so they're not all in the same place.
- The screen lists the file and storage objects. The screen currently shows the Controlfile choices.



- Click the Close button when you are finished adjusting any files.
- Decide if you want to save your decisions as a template for future use.
- If you think you may create a similar database again, this step is a good idea. You can give it a name and a description.
- Save everything you did in a set of scripts and decide where you want them.
- It's a good idea to keep these around just in case. Also, if you're curious about all the scripting work you just avoided by using the DBCA, have a look.
- Decide whether you want to create the database now.
- Click Next to go to the summary screen.
- Click Finish.
- A screen shows all the options you just chose and the parameters you set.
- The creation status screen appears. A status bar and options also appear. You can watch it go through everything until it's done.
- When the database is complete, a screen shows the details. A Password Management button lets you unlock or change the passwords of the users that were created as part of the options you installed. All users except SYS, SYSTEM, DBSNMP, and SYSMAN are locked.
- Click Exit then Close to close the DBCA.

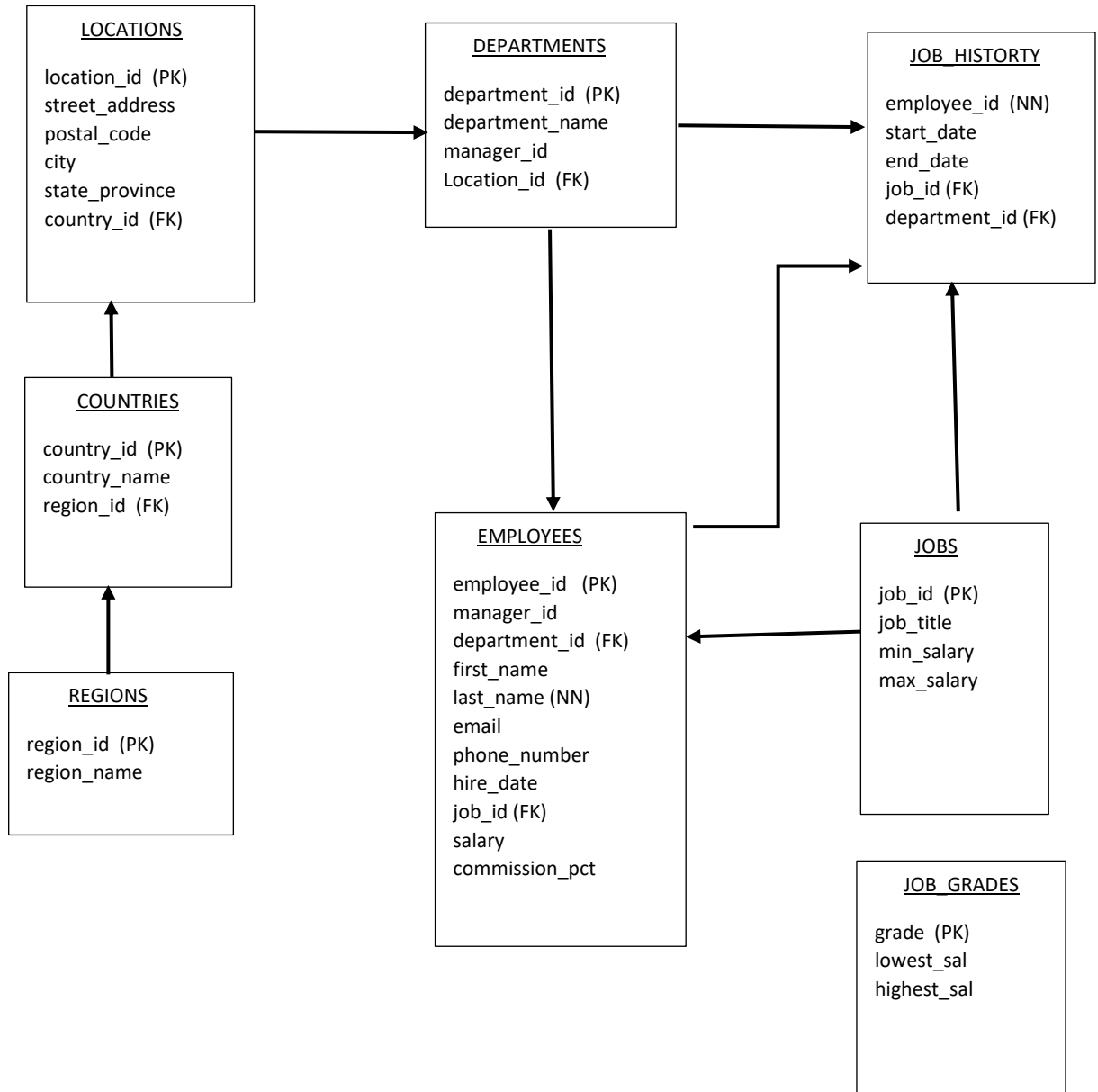
3) Configure a new Oracle user and manage security in the new database (prod)

- Use SQL command to create a user (syntax given below)

```
CREATE USER username
IDENTIFIED BY password
[DEFAULT TABLESPACE tablespace]
[QUOTA {size | UNLIMITED} ON tablespace]
[PROFILE profile]
[PASSWORD EXPIRE]
[ACCOUNT {LOCK | UNLOCK}];
```

- Assign privileges to the new user (ie. grant CONNECT and RESOURCE roles to the new user)
- Now connect to the new user you created by using SQLPlus or SQL Developer tool
- Confirm that you are connected to the new user (schema) - (show user or SELECT user_name from user_users; SQL command)
- Create the following tables (Entity Relation (ER) diagram given below) in the new schema

Human Resources Data Set



Human Resources (HR) Data Set

The project in this course use the data from the HR schema.

Table Descriptions

REGIONS contains rows representing a region (such as Americas, Asia, and so on).

COUNTRIES contains rows for countries, each of which are associated with a region.

LOCATIONS contains the addresses of specific offices, warehouses, and/or production sites of a company in a particular country.

DEPARTMENTS shows details of the departments in which employees work. Each department can have a relationship representing the department manager in the EMPLOYEES table.

EMPLOYEES contains details about each employee who works for a department. Some employees may not be assigned to any department.

JOBS contains the job types that can be held by each employee.

JOB_HISTORY contains the job history of the employees. If an employee changes departments within the job or changes jobs within the department, a new row is inserted in this table with the old job information of the employee.

JOB_GRADES identifies a salary range per job grade. The salary ranges do not overlap.

COUNTRIES table

Describe countries

Name	Null?	Type
COUNTRY_ID	NOT NULL	CHAR(2)
COUNTRY_NAME		VARCHAR2(40)
REGION_ID		NUMBER

DEPARTMENTS table

Describe departments

Name	Null?	Type
DEPARTMENT_ID	NOT NULL	NUMBER(4)
DEPARTMENT_NAME	NOT NULL	VARCHAR2(30)
MANAGER_ID		NUMBER(6)
LOCATION_ID		NUMBER(4)

EMPLOYEES table

describe employees

Name	Null?	Type
EMPLOYEE_ID	NOT NULL	NUMBER(6)
FIRST_NAME		VARCHAR2(20)
LAST_NAME	NOT NULL	VARCHAR2(25)
EMAIL	NOT NULL	VARCHAR2(25)
PHONE_NUMBER		VARCHAR2(20)
HIRE_DATE	NOT NULL	DATE
JOB_ID	NOT NULL	VARCHAR2(10)
SALARY		NUMBER(8,2)
COMMISSION_PCT		NUMBER(2,2)
MANAGER_ID		NUMBER(6)
DEPARTMENT_ID		NUMBER(4)

JOBS table

describe jobs

Name	Null?	Type
JOB_ID	NOT NULL	VARCHAR2(10)
JOB_TITLE	NOT NULL	VARCHAR2(35)
MIN_SALARY		NUMBER(6)
MAX_SALARY		NUMBER(6)

JOB_GRADES table

describe job_grades

Name	Null?	Type
GRADE_LEVEL		VARCHAR2(3)
LOWEST_SAL		NUMBER
HIGHEST_SAL		NUMBER

JOB_HISTORY table

describe job_history

Name	Null?	Type
EMPLOYEE_ID	NOT NULL	NUMBER(6)
START_DATE	NOT NULL	DATE
END_DATE	NOT NULL	DATE
JOB_ID	NOT NULL	VARCHAR2(10)
DEPARTMENT_ID		NUMBER(4)

LOCATIONS table

describe locations

Name	Null?	Type
LOCATION_ID	NOT NULL	NUMBER(4)
STREET_ADDRESS		VARCHAR2(40)
POSTAL_CODE		VARCHAR2(12)
CITY	NOT NULL	VARCHAR2(30)
STATE_PROVINCE		VARCHAR2(25)
COUNTRY_ID		CHAR(2)

REGIONS table

describe regions

Name	Null?	Type
REGION_ID	NOT NULL	NUMBER
REGION_NAME		VARCHAR2(25)

Data for the above tables

SELECT * FROM COUNTRIES;

CO	COUNTRY_NAME	REGION_ID
CA	Canada	2
DE	Germany	1
UK	United Kingdom	1
US	United States of America	2

SELECT * FROM DEPARTMENTS;

DEPARTMENT_ID	DEPARTMENT_NAME	MANAGER_ID	LOCATION_ID
10	Administration	200	1700
20	Marketing	201	1800
50	Shipping	124	1500
60	IT	103	1400
80	Sales	149	2500
90	Executive	100	1700
110	Accounting	205	1700
190	Contracting		1700

8 rows selected.

SELECT * FROM EMPLOYEES;

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NUMBER	HIRE_DATE
100	Steven	King	SKING	515.123.4567	17-JUN-87
101	Neena	Kochhar	NKOCHHAR	515.123.4568	21-SEP-89
102	Lex	De Haan	LDEHAAN	515.123.4569	13-JAN-93
103	Alexander	Hunold	AHUNOLD	590.423.4567	03-JAN-90
104	Bruce	Ernst	BERNST	590.423.4568	21-MAY-91
107	Diana	Lorentz	DLORENTZ	590.423.5567	07-FEB-99
124	Kewin	Mourgos	KMOURGOS	650.123.5234	16-NOV-99
141	Trenna	Rajs	TRAJS	650.121.8009	17-OCT-95
142	Curtis	Davies	CDAVIES	650.121.2994	29-JAN-97
143	Randall	Matos	RMATOS	650.121.2874	15-MAR-98
144	Peter	Vargas	PVARGAS	650.121.2004	09-JUL-98
149	Eleni	Zlotkey	EZLOTKEY	011.44.1344.429018	29-JAN-00
174	Ellen	Abel	EABEL	011.44.1644.429267	11-MAY-96
176	Jonathon	Taylor	JTAYLOR	011.44.1644.429265	24-MAR-98
178	Kimberely	Grant	KGRANT	011.44.1644.429263	24-MAY-99
200	Jennifer	Whalen	JWHALEN	515.123.4444	17-SEP-87
201	Michael	Hartstein	MHARTSTE	515.123.5555	17-FEB-96
202	Pat	Fay	PFAY	603.123.6666	17-AUG-97
205	Shelley	Higgins	SHIGGINS	515.123.8080	07-JUN-94
206	William	Gietz	WGIETZ	515.123.8181	07-JUN-94

20 rows selected.

SELECT * FROM EMPLOYEES (continued)

JOB_ID	SALARY	COMMISSION_PCT	MANAGER_ID	DEPARTMENT_ID
AD_PRES	24000			90
AD_VP	17000		100	90
AD_VP	17000		100	90
IT_PROG	9000		102	60
IT_PROG	6000		103	60
IT_PROG	4200		103	60
ST_MAN	5800		100	50
ST_CLERK	3500		124	50
ST_CLERK	3100		124	50
ST_CLERK	2600		124	50
ST_CLERK	2500		124	50
SA_MAN	10500	.2	100	80
SA_REP	11000	.3	149	80
SA_REP	8600	.2	149	80
SA_REP	7000	.15	149	
AD_ASST	4400		101	10
MK_MAN	13000		100	20
MK_REP	6000		201	20
AC_MGR	12000		101	110
AC_ACCOUNT	8300		205	110

20 rows selected.

SELECT * FROM JOBS;

JOB_ID	JOB_TITLE	MIN_SALARY	MAX_SALARY
AD_PRES	President	20000	40000
AD_VP	Administration Vice President	15000	30000
AD_ASST	Administration Assistant	3000	6000
AC_MGR	Accounting Manager	8200	16000
AC_ACCOUNT	Public Accountant	4200	9000
SA_MAN	Sales Manager	10000	20000
SA_REP	Sales Representative	6000	12000
ST_MAN	Stock Manager	5500	8500
ST_CLERK	Stock Clerk	2000	5000
IT_PROG	Programmer	4000	10000
MK_MAN	Marketing Manager	9000	15000
MK_REP	Marketing Representative	4000	9000

12 rows selected.

SELECT * FROM JOB_GRADES;

GRA	LOWEST_SAL	HIGHEST_SAL
A	1000	2999
B	3000	5999
C	6000	9999
D	10000	14999
E	15000	24999
F	25000	40000

6 rows selected.

SELECT * FROM JOB_HISTORY;

EMPLOYEE_ID	START_DAT	END_DATE	JOB_ID	DEPARTMENT_ID
102	13-JAN-93	24-JUL-98	IT_PROG	60
101	21-SEP-89	27-OCT-93	AC_ACCOUNT	110
101	28-OCT-93	15-MAR-97	AC_MGR	110
201	17-FEB-96	19-DEC-99	MK_REP	20
114	24-MAR-98	31-DEC-99	ST_CLERK	50
122	01-JAN-99	31-DEC-99	ST_CLERK	50
200	17-SEP-87	17-JUN-93	AD_ASST	90
176	24-MAR-98	31-DEC-98	SA_REP	80
176	01-JAN-99	31-DEC-99	SA_MAN	80
200	01-JUL-94	31-DEC-98	AC_ACCOUNT	90

10 rows selected.

SELECT * FROM LOCATIONS;

LOCATION_ID	STREET_ADDRESS	POSTAL_CODE	CITY	STATE_PROVINCE	CO
1400	2014 Jabberwocky Rd	26192	Southlake	Texas	US
1500	2011 Interiors Blvd	99236	South San Francisco	California	US
1700	2004 Charade Rd	98199	Seattle	Washington	US
1800	460 Bloor St. W.	ON M5S 1X8	Toronto	Ontario	CA
2500	Magdalen Centre, The Oxford Science Park	OX9 9ZB	Oxford	Oxford	UK

SELECT * FROM REGIONS;

REGION_ID	REGION_NAME
1	Europe
2	Americas
3	Asia
4	Middle East and Africa

4. SQL commands – Practices

- Duplicate employees table into employees1 table
- Duplicate employees table into employees2 table without any data (ie. only the structure)
- Query all the departments data
- Create a view to display the employee_id, first_name, last_name, salary from employees table
- Query the view to display the data
- Create another view to display the first_name, last_name, salary, department_name (complex view- view based on multiple tables)
- Query all the employees first_name, last_name, salary who earn more than \$7000. Sort the data by salary in descending order
- Display all employees last_name whose third letter in last_name is "a"
- Display the last_name and department number of all employees in department 20 or 50. Sort the data by department number
- Query the employees table to display the department id and total salary for each department
- Display all the employees who earn more than the average salary of the company (use sub-query)
- Create the following table in your schema. Name the table DEPT

Column name	ID	NAME
Key type	Primary key	
Null/unique		Unique
FK table		
FK column		
Datatype	Number	Varchar2
Length	7	25

- Describe the table to find the DEPT table structure
- Insert five rows in DEPT table and commit the inserts. Query the DEPT table to confirm your inserts
- Update one of the department names in DEPT table to another value and commit the data
- Delete ONE of the rows from DEPT table
- You realise you made a mistake of deleting the wrong row. Undo the delete
- Create the following table in your schema. Name the table EMP

Column name	ID	FIRST_NAME	LAST_NAME	DEPT_ID
Key type	Primary key			
Null/unique		Not null		
FK table				DEPT
FK column				ID
Datatype	Number	Varchar2	Varchar2	number
Length	7	25	25	7

- Insert eight rows in the EMP table. Ensure PK/FK relationship not violated (ie. department must exist in DEPT table before inserting an employee in the EMP table).
- Modify the table by adding COMMISSION column
- Change the column length of FIRST_NAME to 30 characters
- Drop the COMMISSION column from table EMP table
- Duplicate the EMP table to NEW_EMP table
- Make the NEW_EMP table read only. Confirm it by querying. Try to update a row in NEW_EMP table. What happens?

- Revert the NEW_EMP table to read write and confirm it.
- Drop DEPT, EMP, and NEW_EMP tables