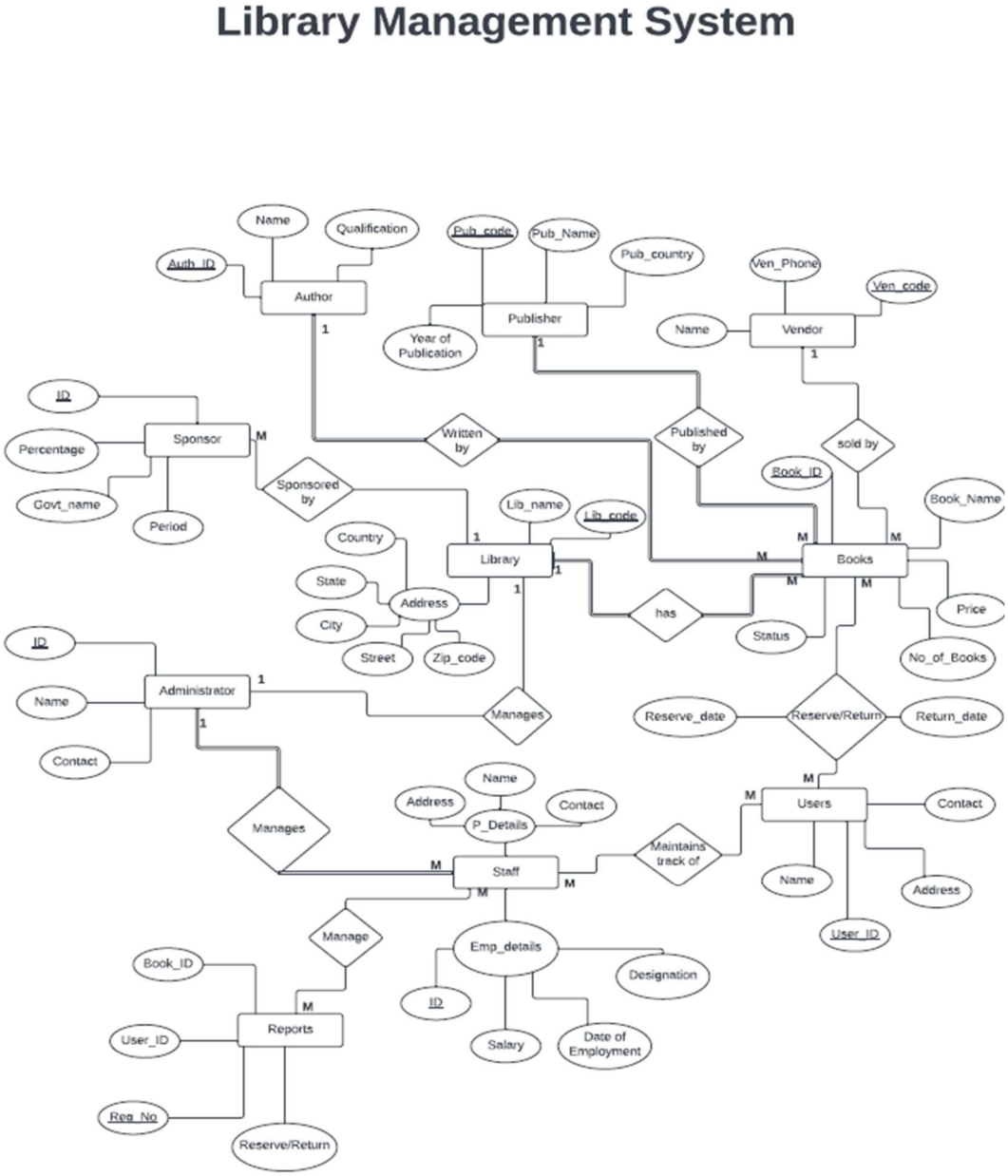
Library Management System – Part 1

Description:

Our goal is to design the library database system in Oracle 21c. We will create tables, columns, and rows of data by writing SQL code using the Oracle query tool. Before all that could happen, we conceptualized our idea for the Library Management System through an E-R diagram. Our general idea for the system is that this international library system and many libraries in many countries. As such, we chose the library as an entity that is defined by Library Code, which is its primary key, Library name, and Address (a multivalued attribute). Next, each library contains books, and they have authors and publishers, all of which are recognized as entities. Each book is identified by its ISBN/Book, title, price, status, and Number of copies. Books are sold to the library by vendors, which is another entity with attributes. For publishers, we chose to define it by the attributes Publisher code, Publisher Name, Country, and the year of publication. The author is identified uniquely by an Author Code and attributed by Author Name and qualification. The library would require funding. For this, we made the Sponsor an entity. Each sponsor has an ID, budget percentage, name, and period. Each library is managed by an Administrator, who can be identified by their ID, name, and contact. Each administrator has a staff working for the library under them. The staff have employee details and personal details. The employee details, A multivalued attribute, contain primary key employee ID, salary, date of employment, and designation. The staff deals with the users or customers, which is another entity. The User entity contains a User ID, which identifies each user uniquely from the database. Other attributes include Name, address, and contact which can also uniquely identify a user. The books and users can further be related through the due date or reserve date specifically, decided the records kept by the staff would be an entity, specifically a weak entity, the attributes for this are Book ID, and User ID which are foreign keys. A registration number would act as a primary key with reserve/return date as another attribute. Now we will look at the relationships between the entities. Each Library has multiple books thus making it a 1 to many relationships. Several users use numerous books which gives a many-to-many relationship between them. The same relation applies to the staff and users. One single administrator manages the staff in one library. For this, the administrator and staff have 1 too many relationships in that order. Each library has one administrator which makes it a 1 to 1 relationship. Similarly, a single author/publisher/vendor can write/publish/sell multiple books making all these a 1 to many relationships.

ER Diagram:



Assumptions:

Library(Lib_code, Lib_Name, State, City, Country, Street, Zip_code)

Books(Book_ID, Book_name, Price, No_of_Books, Status)

Administrator(ID, Name, Contact)

Staff(ID, Salary, Date_of_employment, Designation, Address, Name, Contact)

Reports(Reg_No, Book_ID, User_ID, Reserve/Return)

Users(user_id, name, Contact, address)

Sponsor(ID, Percentage, Govt_Name, Period)

Author(Auth_ID, Name, Qualification)

Publisher(Pub_code, Pub_Name, Pub_country, Year_of_publication)

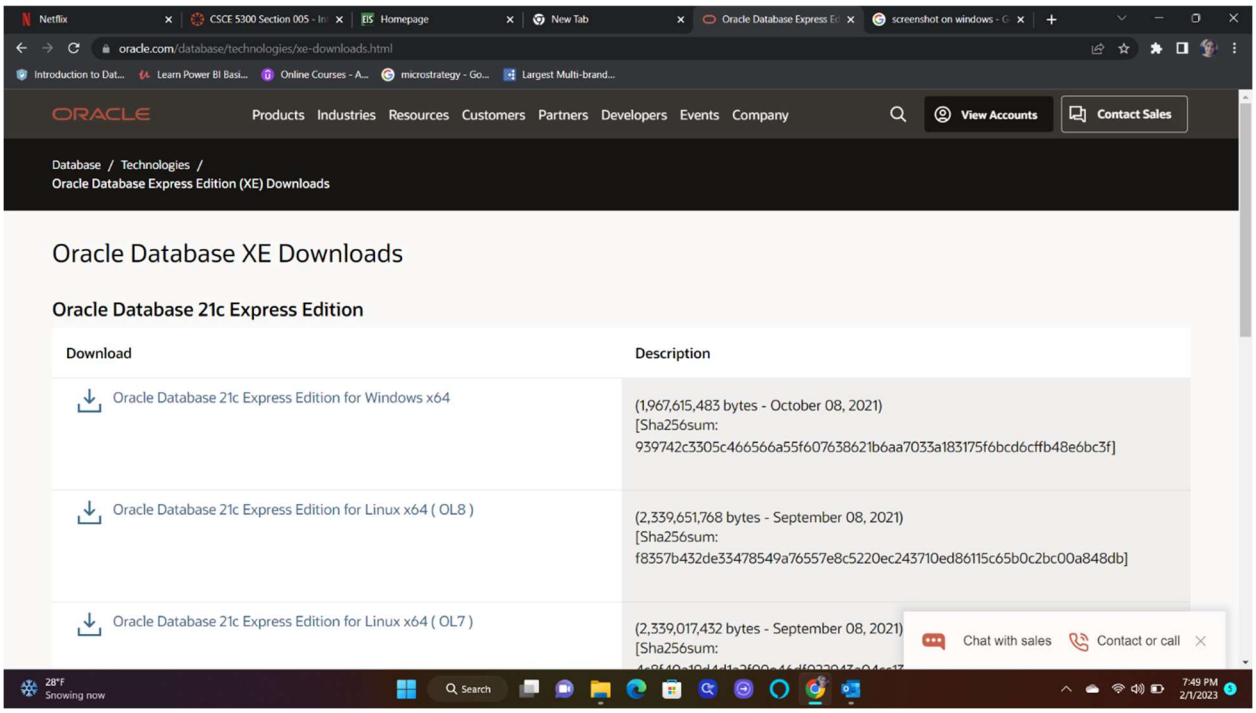
Vendor (Ven_code,Ven_phone,Name)

Oracle Installation:

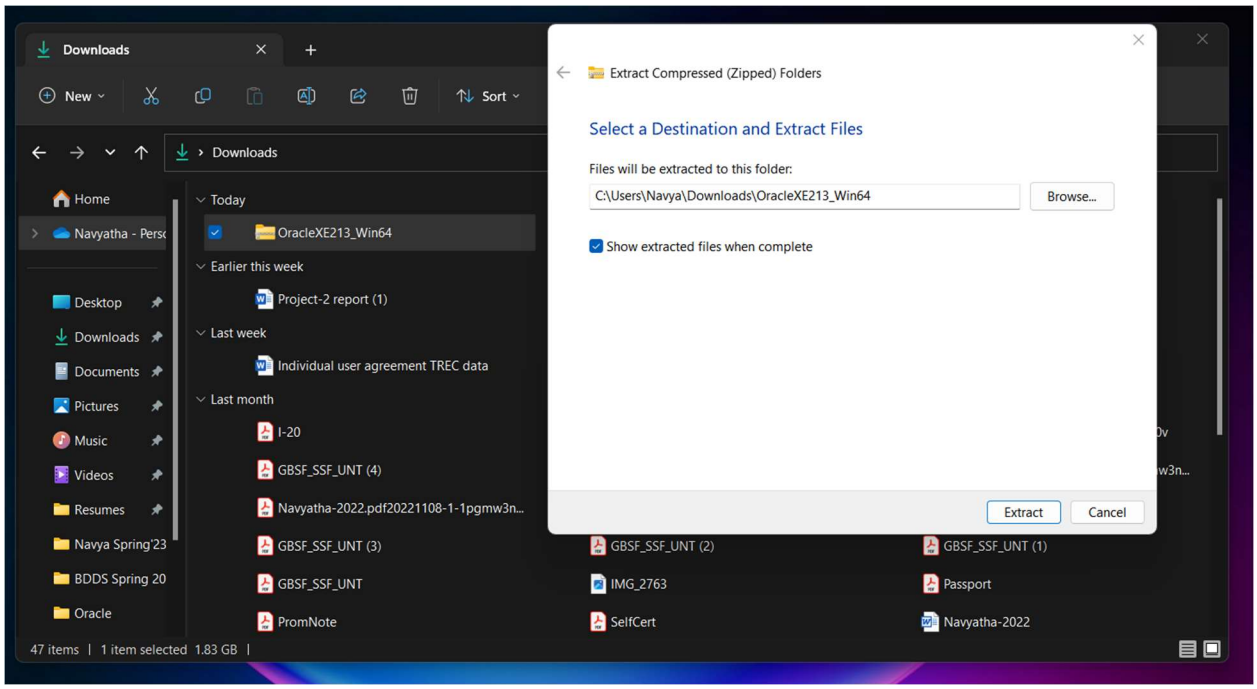
Steps to be followed –

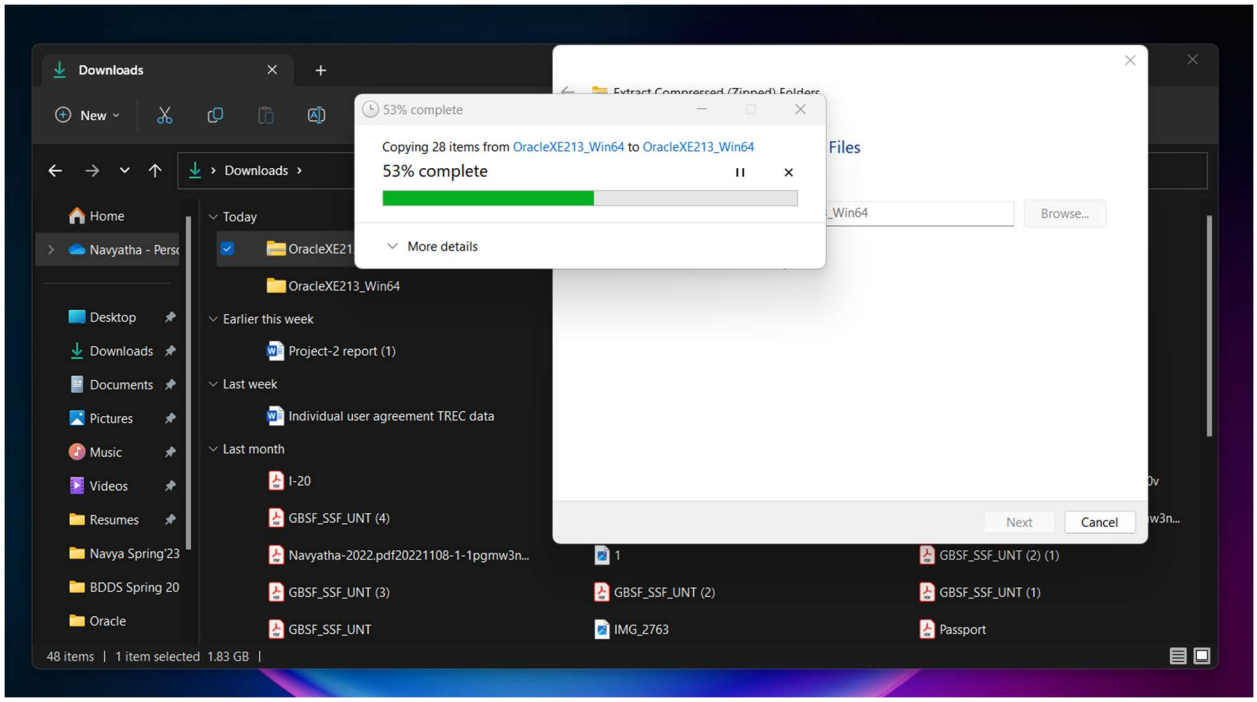
1. Open the link https://www.oracle.com/database/technologies/xe-downloads.html in your browser.

2. Click on "*Oracle Database 21c Express Edition"* from the list displayed.

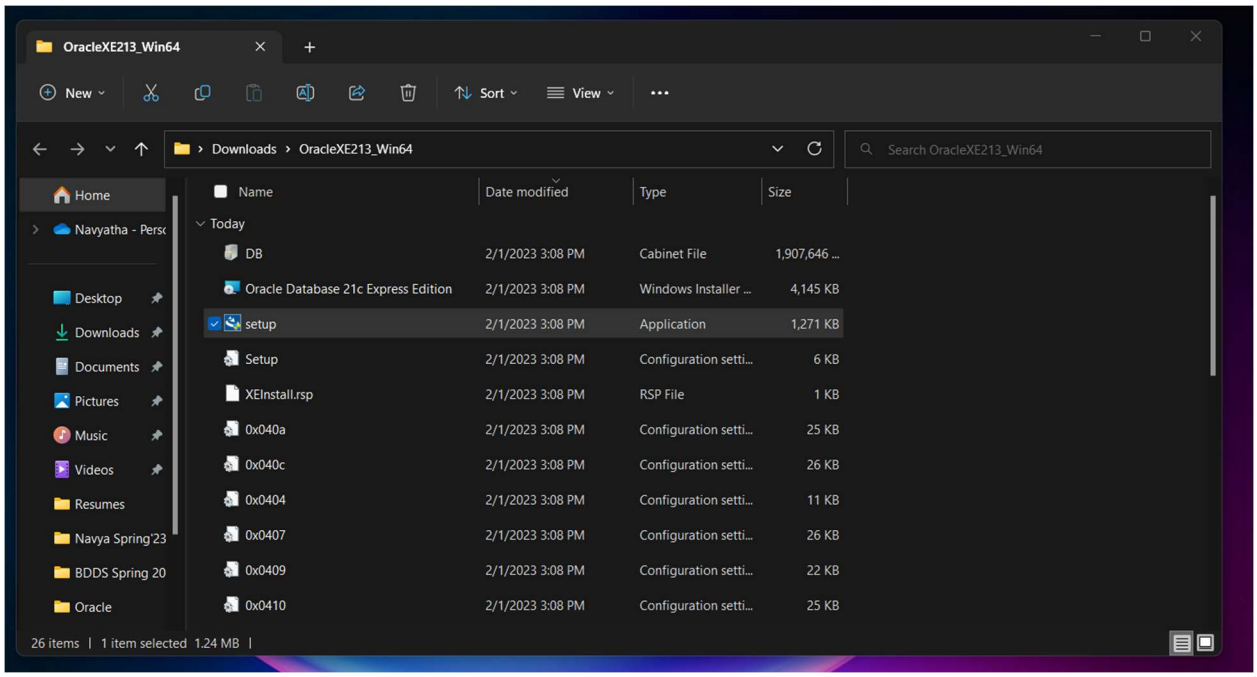


3. Go to the location where the file is downloaded and extract all the contents from the zip file.

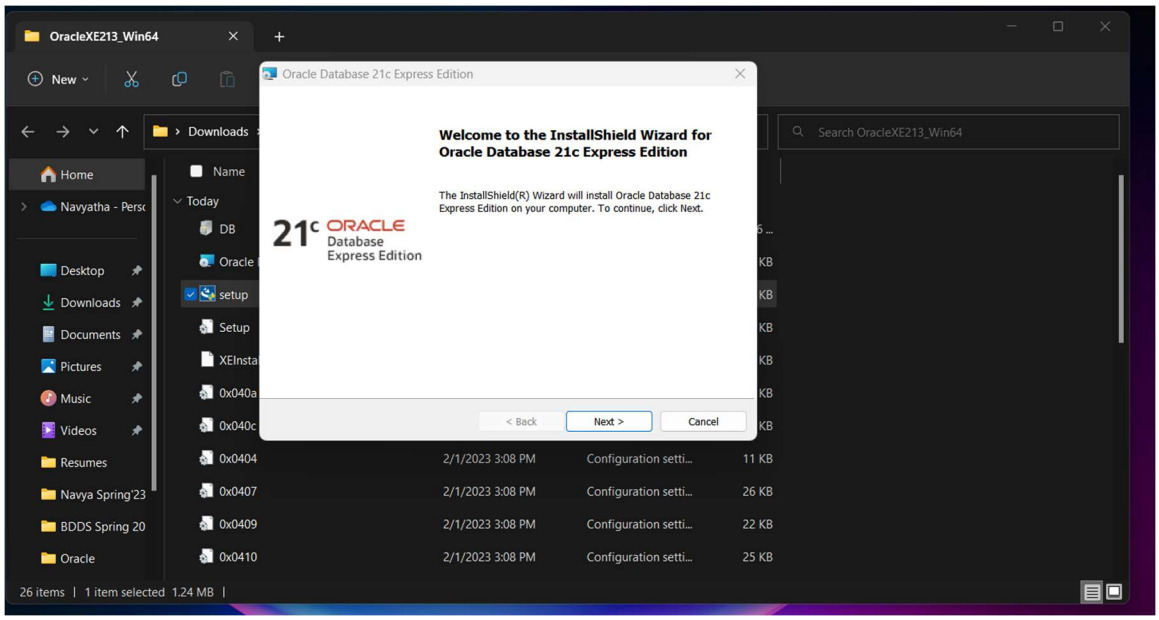




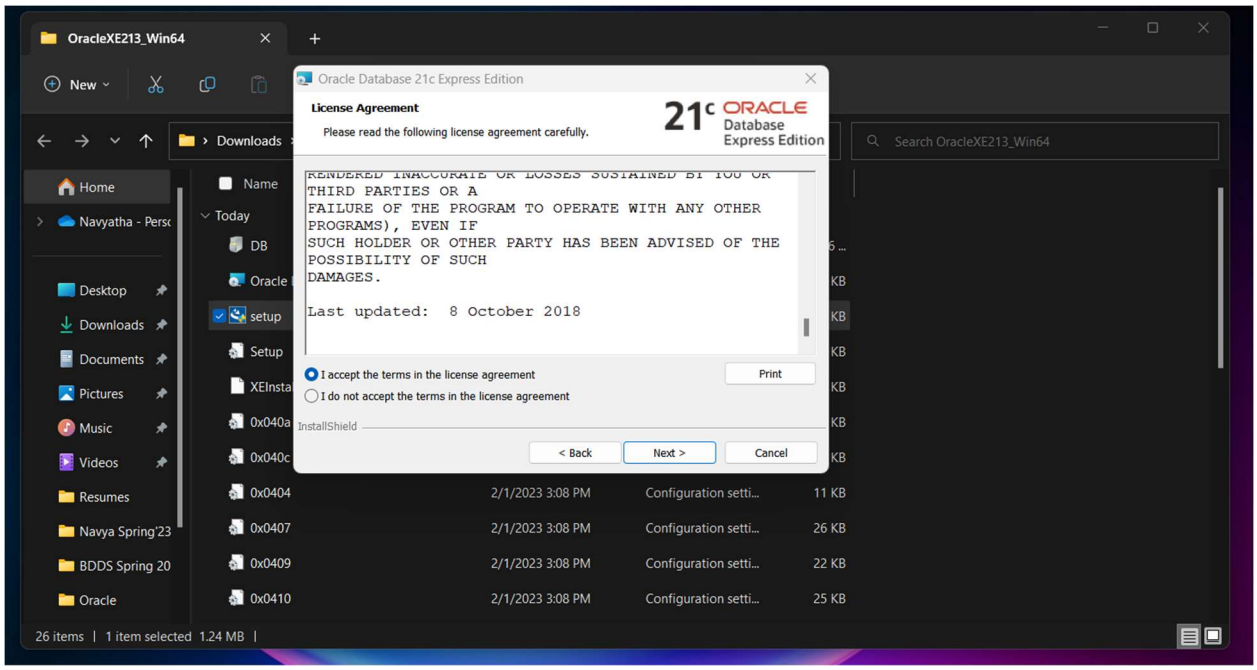
4. Open the directory, and choose the setup application to start the installation.



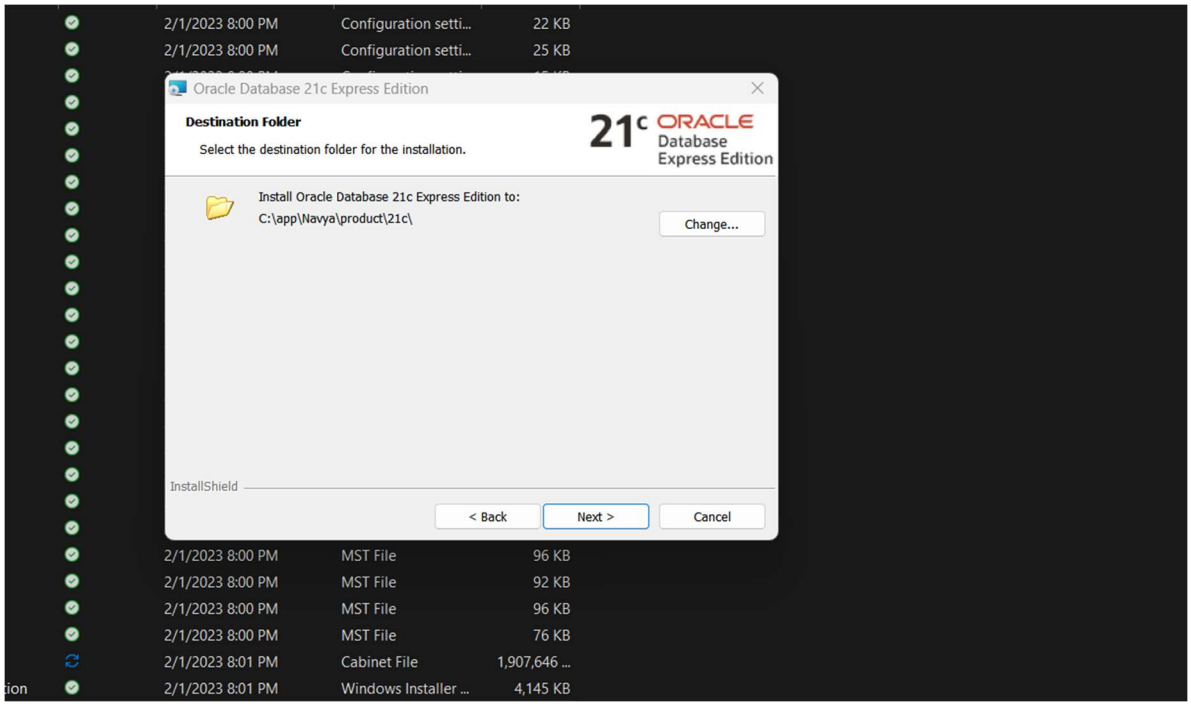
5. On the installation wizard click on the Next button.



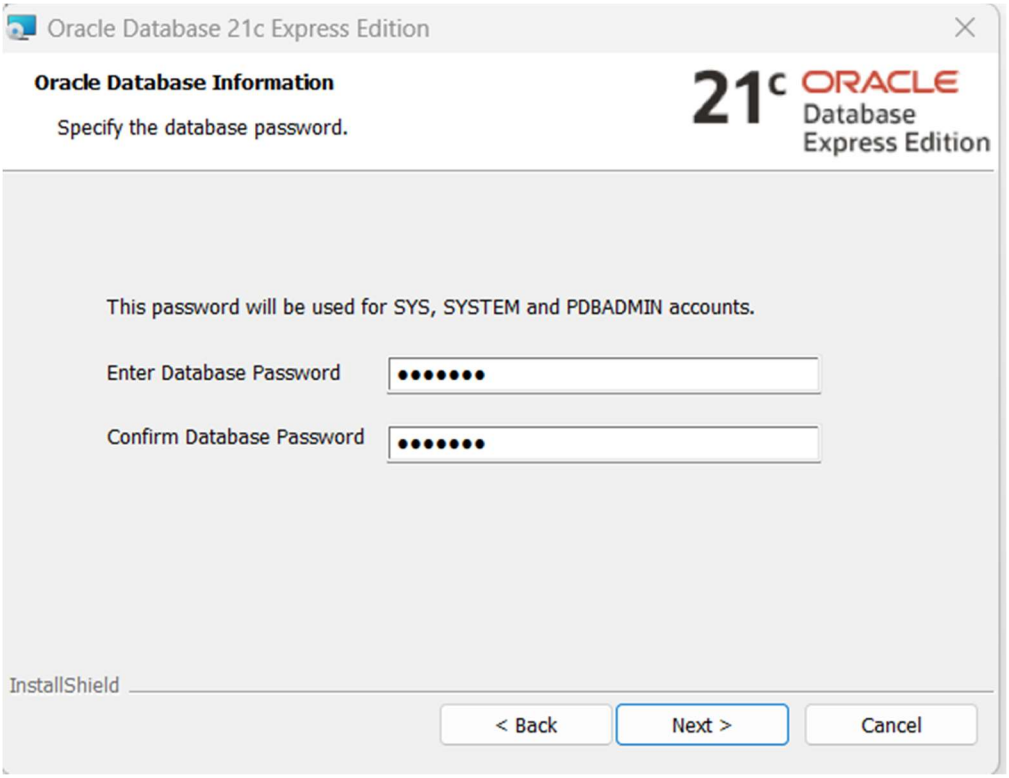
6. Accept the terms and click on the next button.



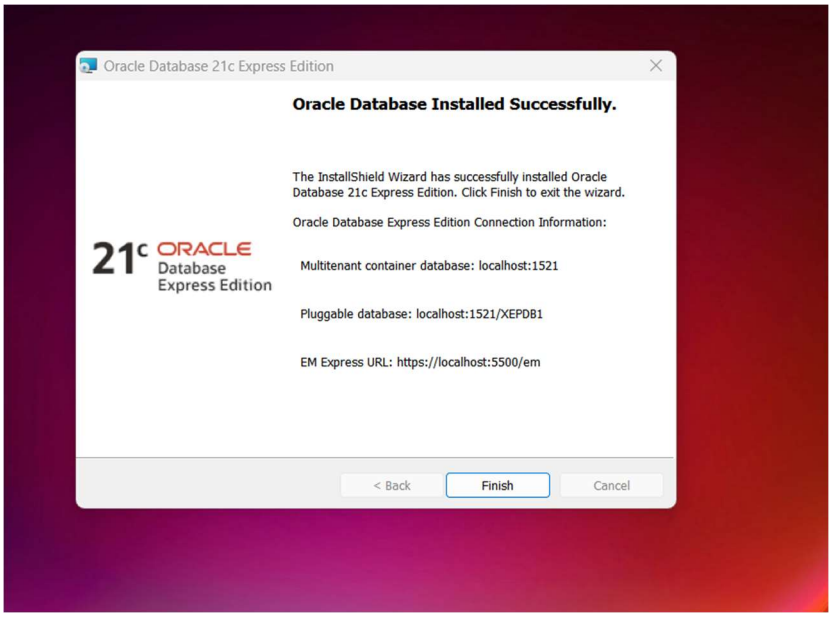
7. Click on the Next button.



8. Enter a Password for your database and keep a reminder of it. Click on the Next button.

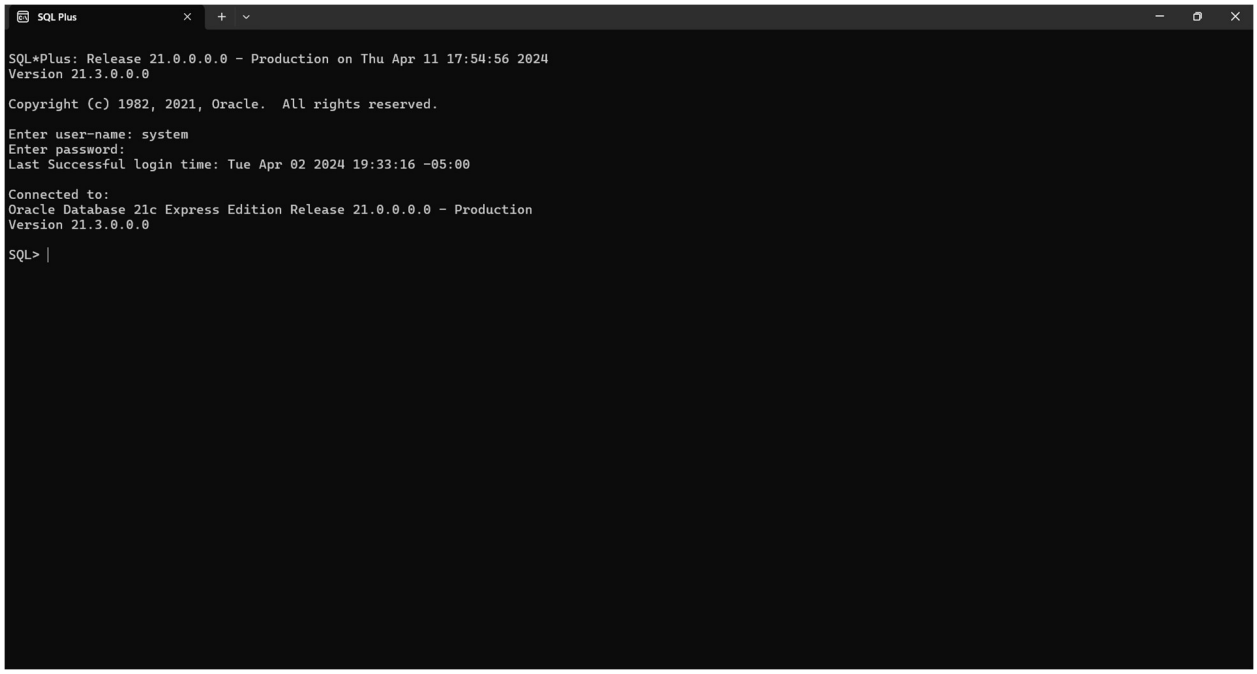


9. Click on the Install button and wait until the installation finishes. Then, click on the Finish button.



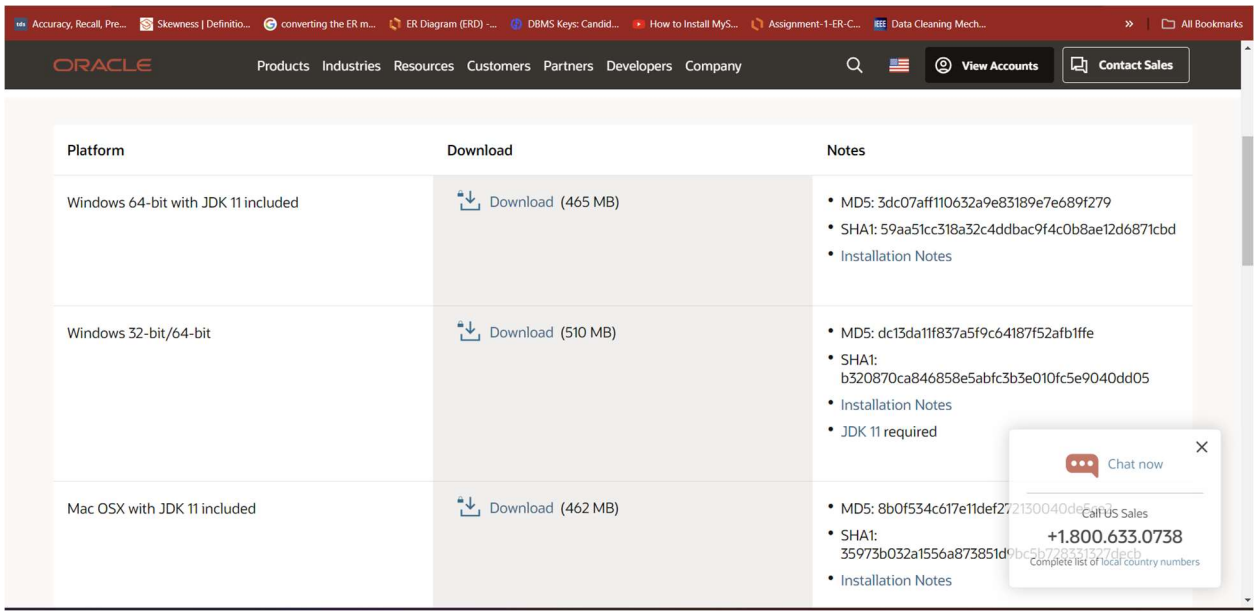
SQL Plus:

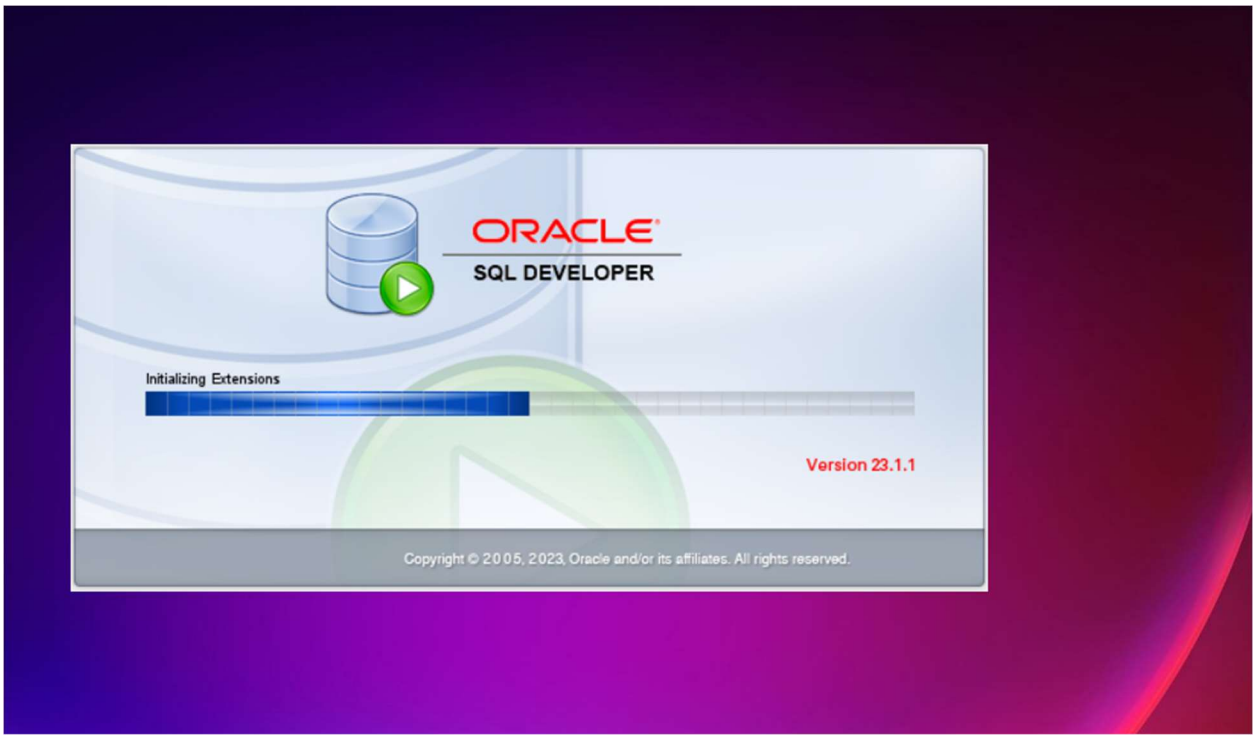
SQL Plus prompt shows a successful connection with the database after entering the username and password.



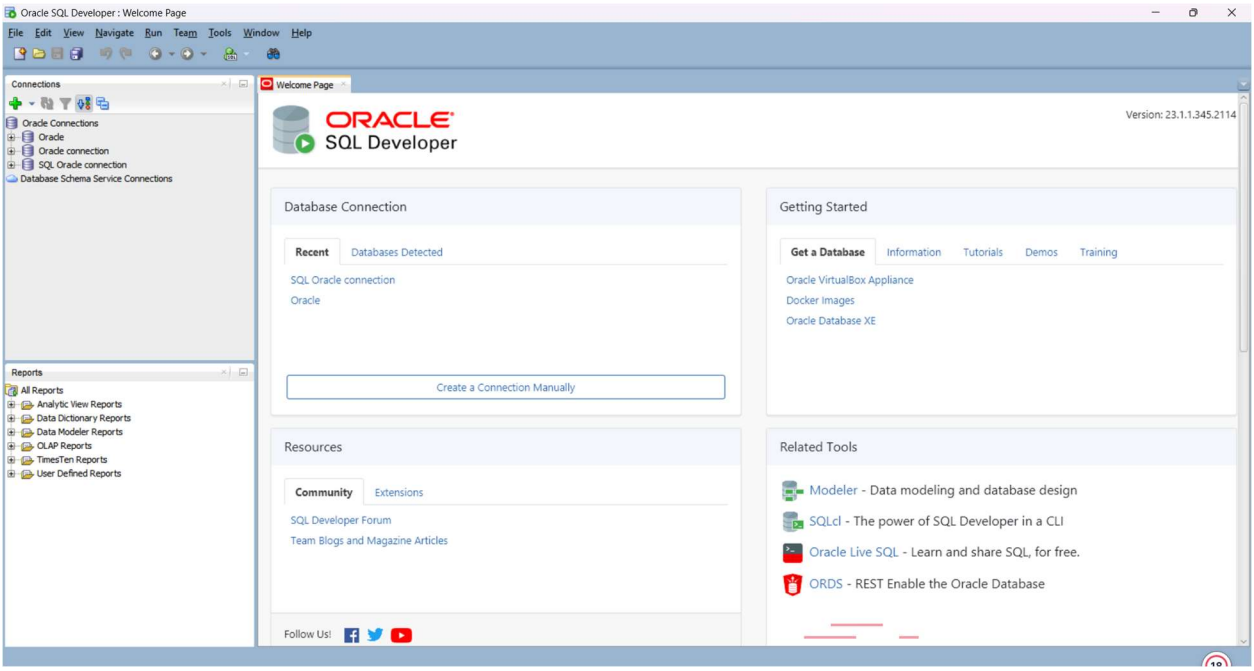
SQL Developer Installation:

The below screenshots show the downloads page of SQL Developer, which can be used to connect to any SQL database.

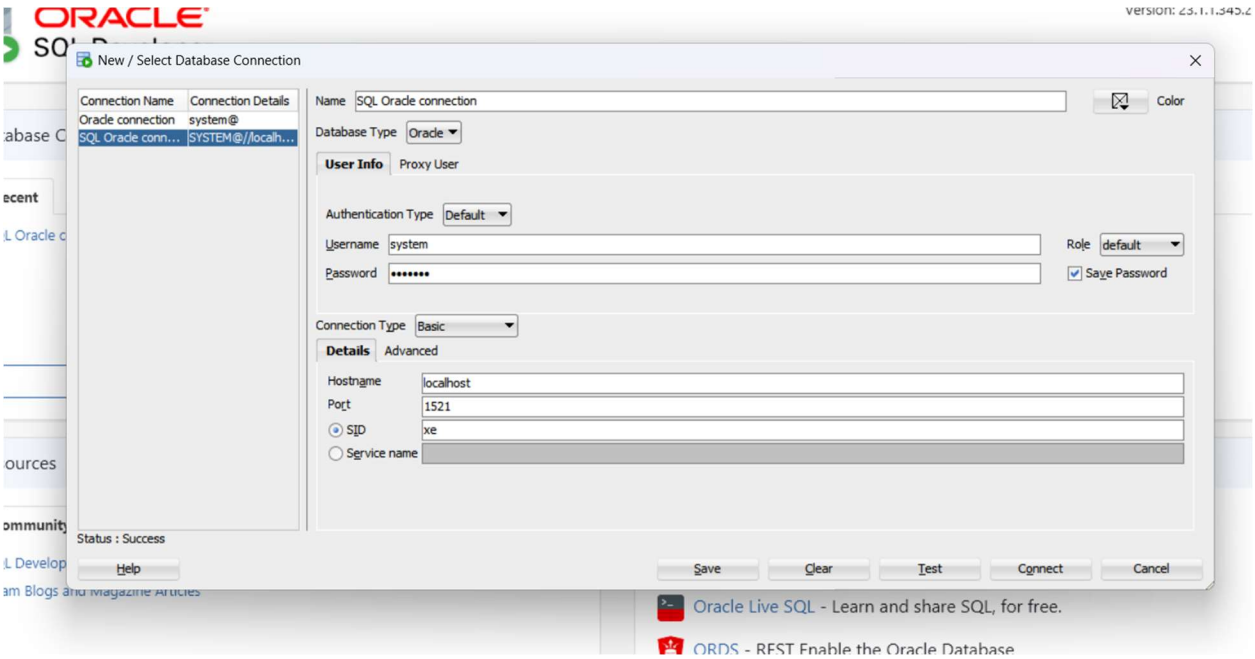




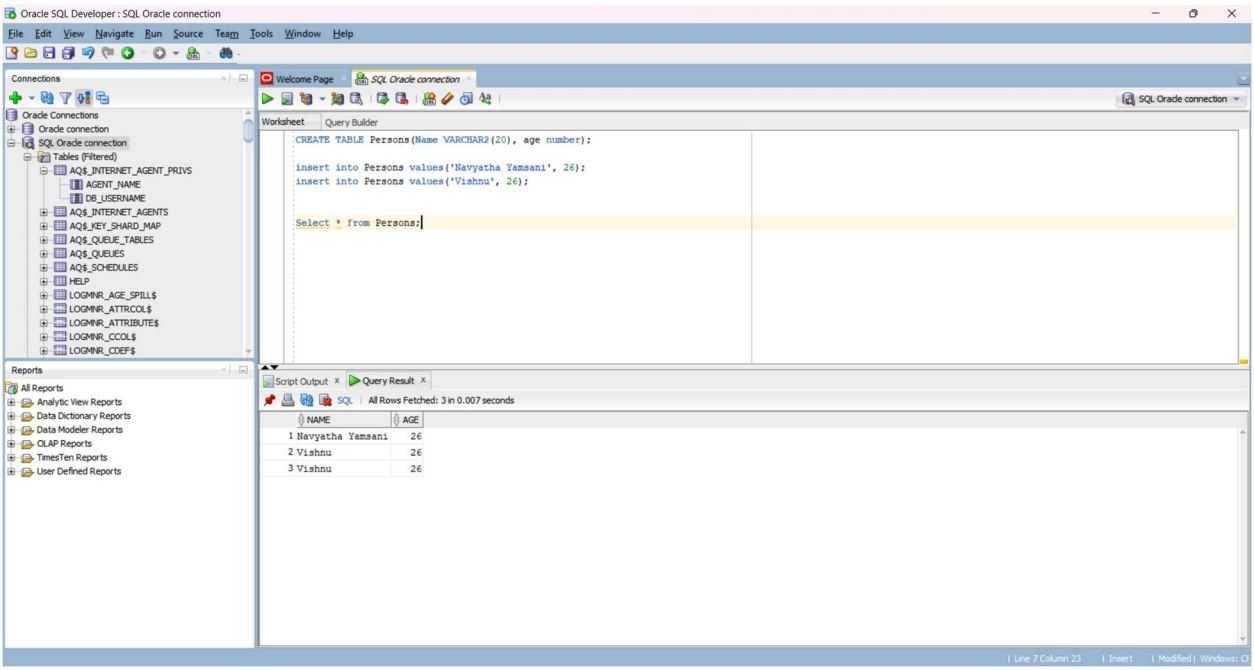
The below screenshot shows the homepage of the SQL Developer, where we can start connecting to Oracle DB and perform actions.



The below screenshots show the connection page of the SQL developer, where we can provide the username, password, host, port, etc. to connect to a SQL DB. By clicking on the “Test”, we have tested the connection which is a success.

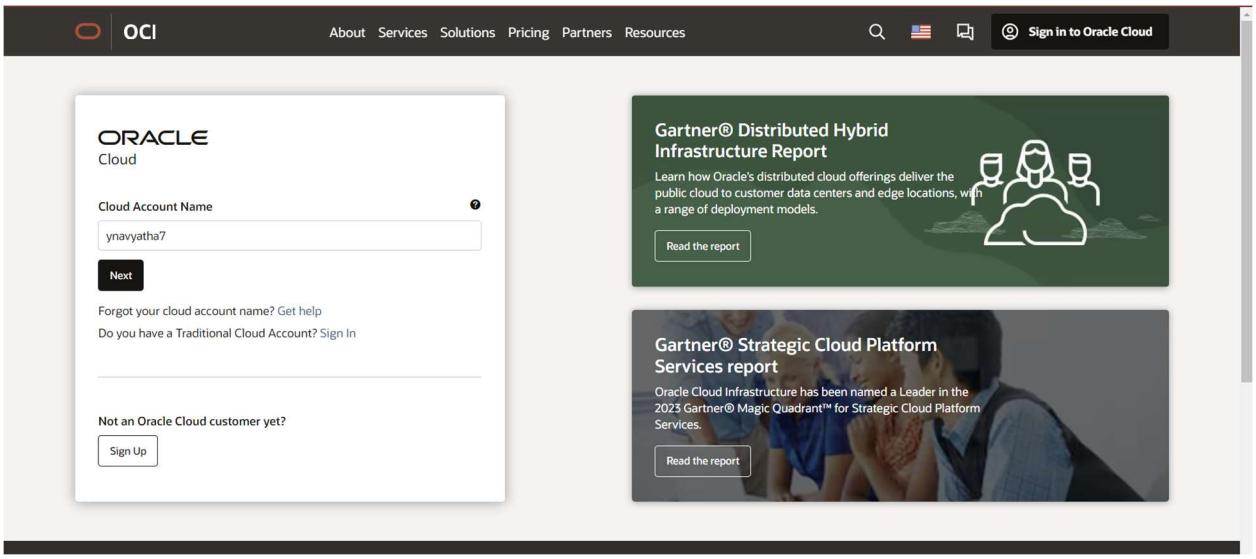


The below screenshot shows the creation of an oracle table “Persons”, the insertion of records into it, and the data present in the table using the “Select” statement. This shows a successful connection to the Oracle database.

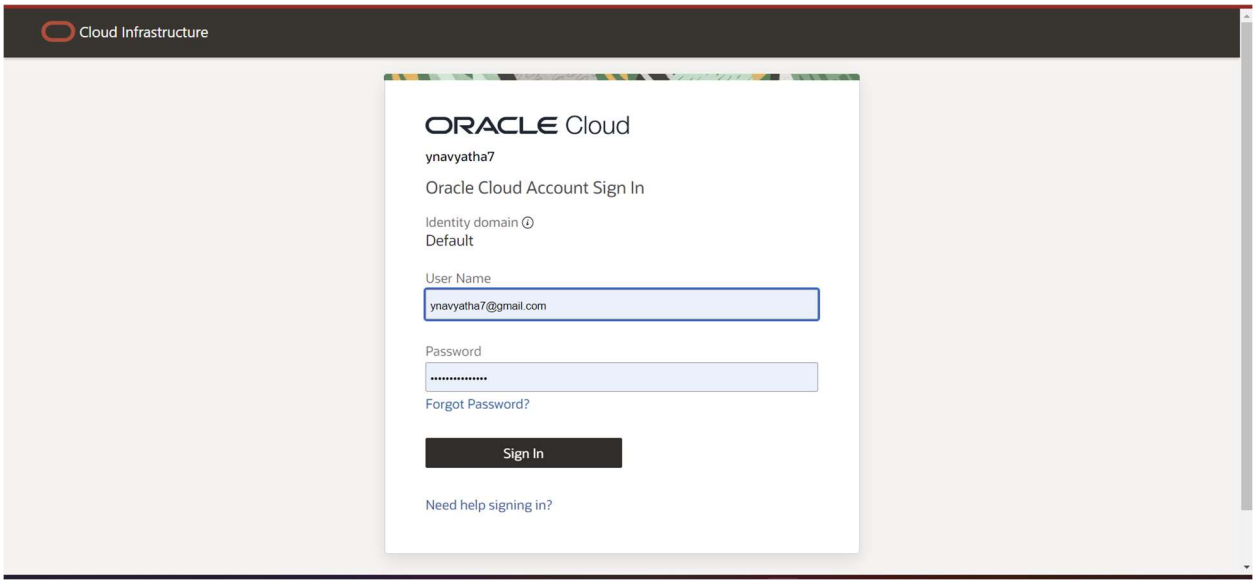


Oracle Cloud Signup:

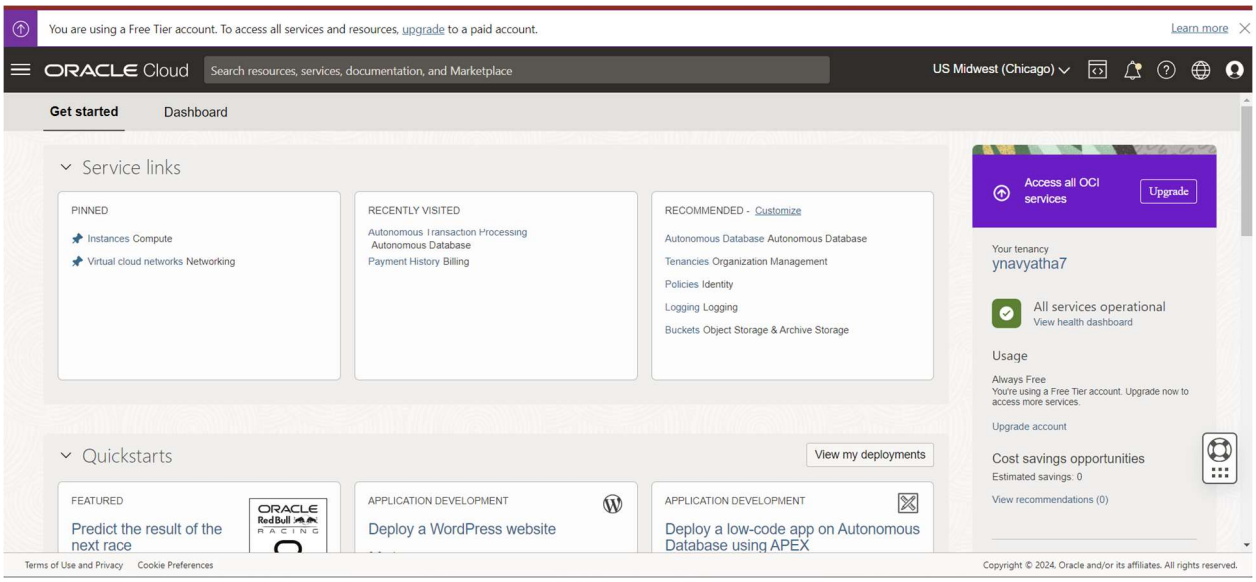
In this section, we will discuss Oracle Cloud installation, and attached are the respective screenshots. As I already have an account, I am going through the sign-in process.



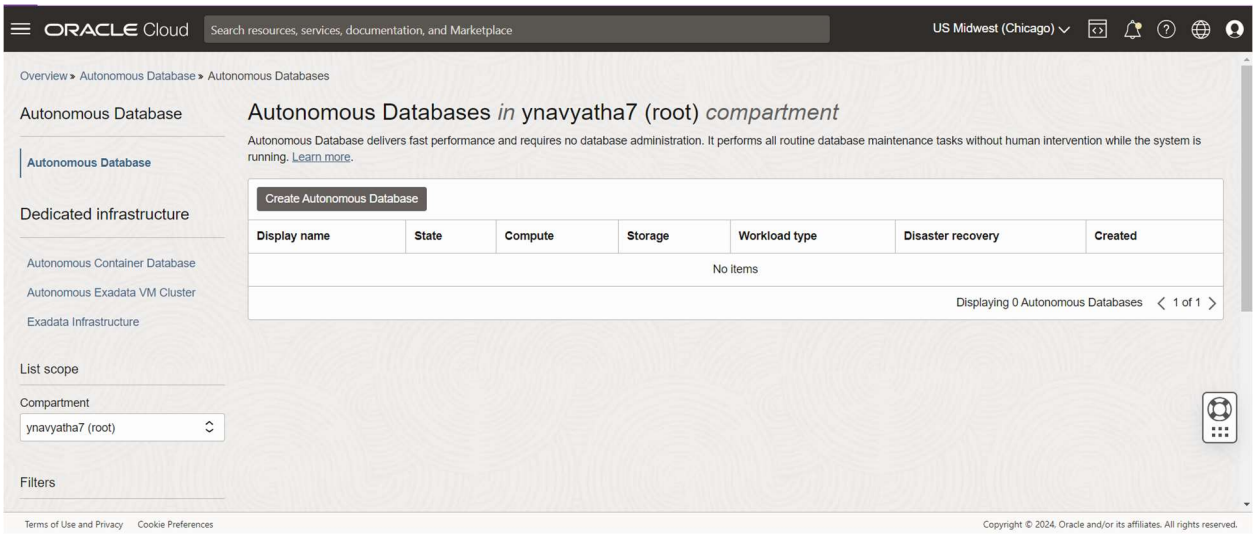
I have given my Username and Password to sign into Oracle Cloud.



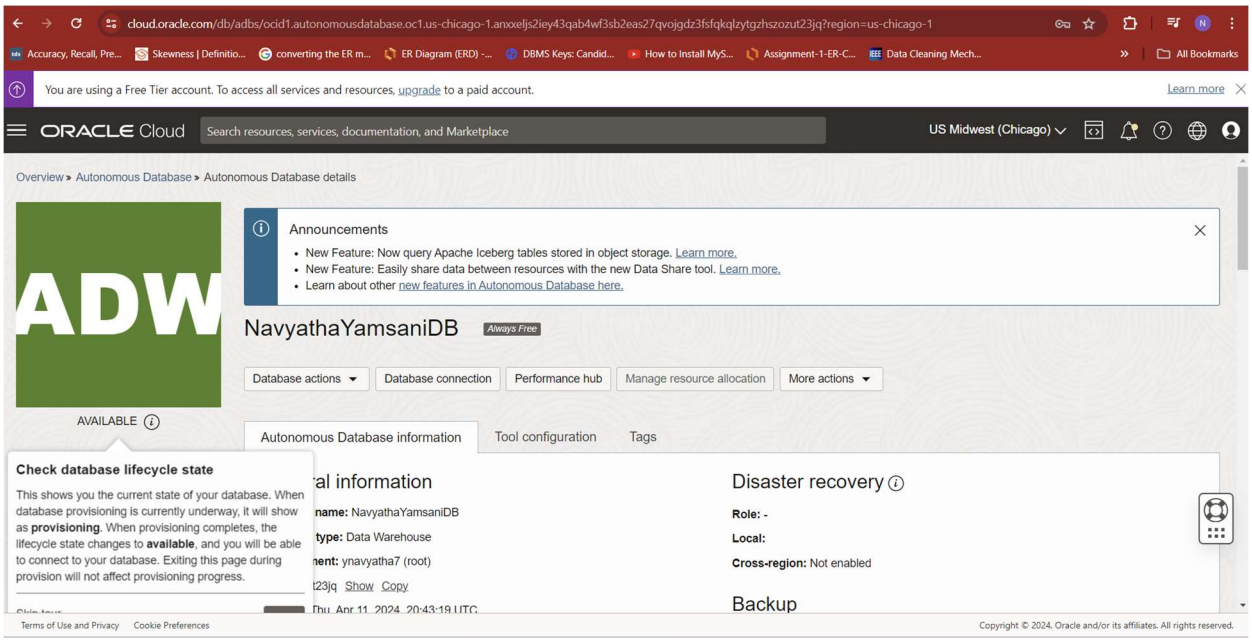
Once after successful sign-in, I have seen the respective dashboard from where we can see an option to create an autonomous database.



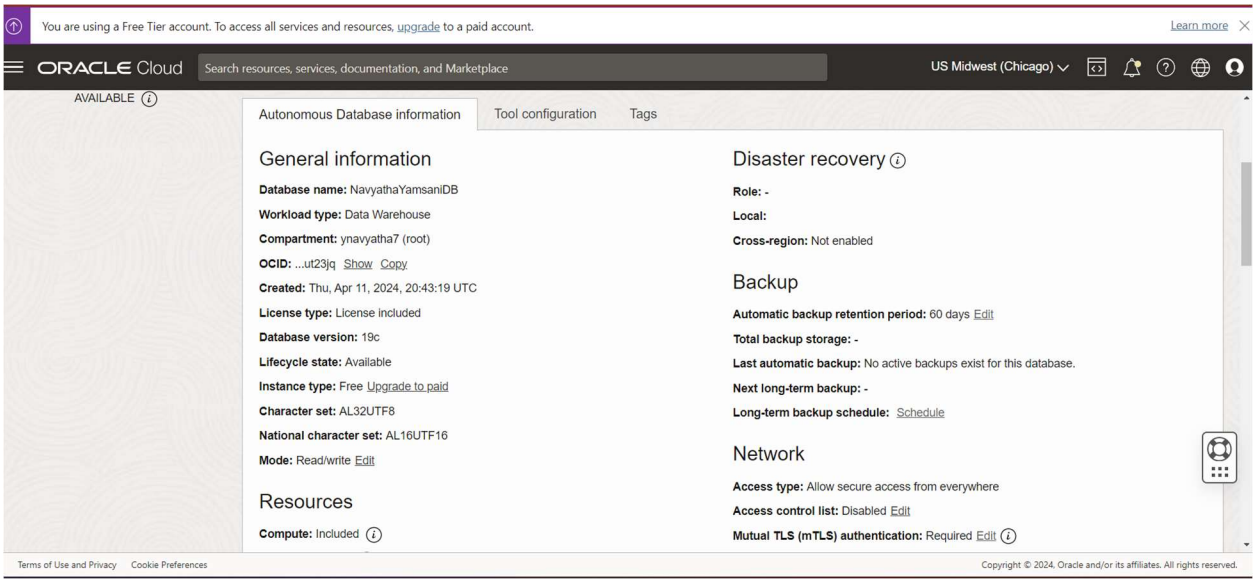
We can create an autonomous database from this page.



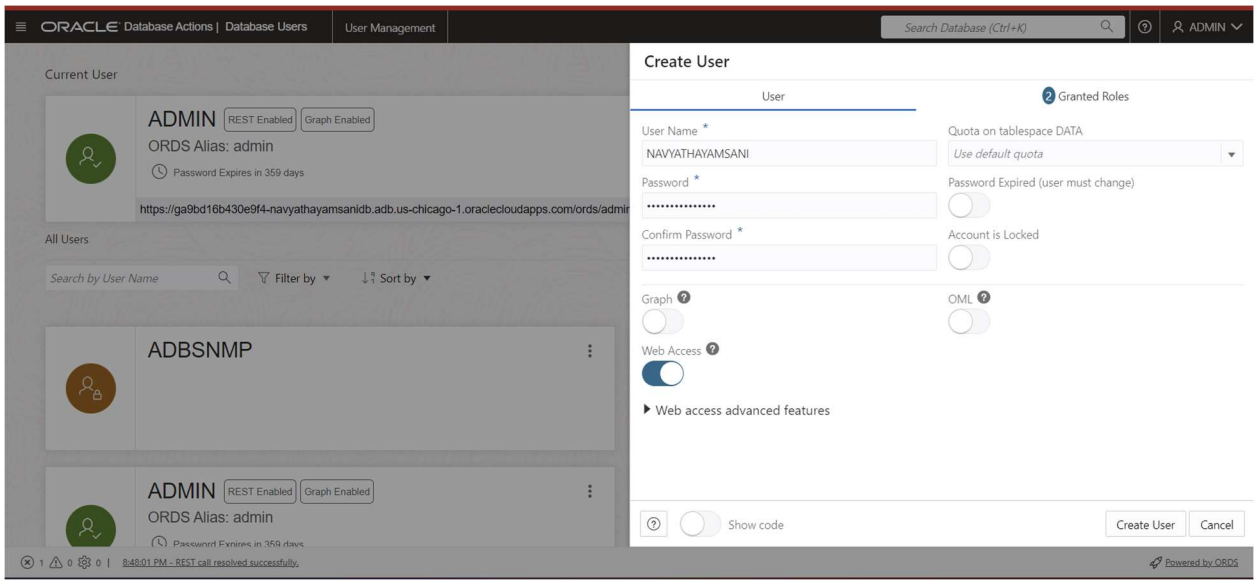
I have given details that is a compartment, Display name, and Database name to create an autonomous database in Oracle Cloud. Once after providing the details, it Initiates the Database creation. Once after that, the below screenshot shows that the database creation is in “Provisioning”.

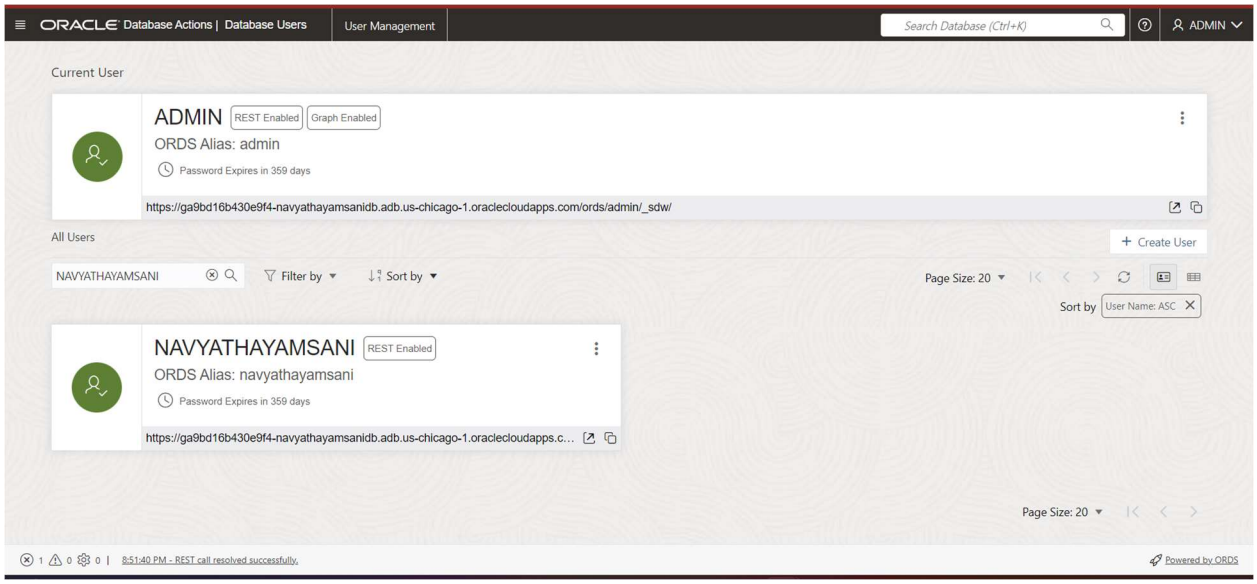


An Autonomous Database is created and is in an Available state.

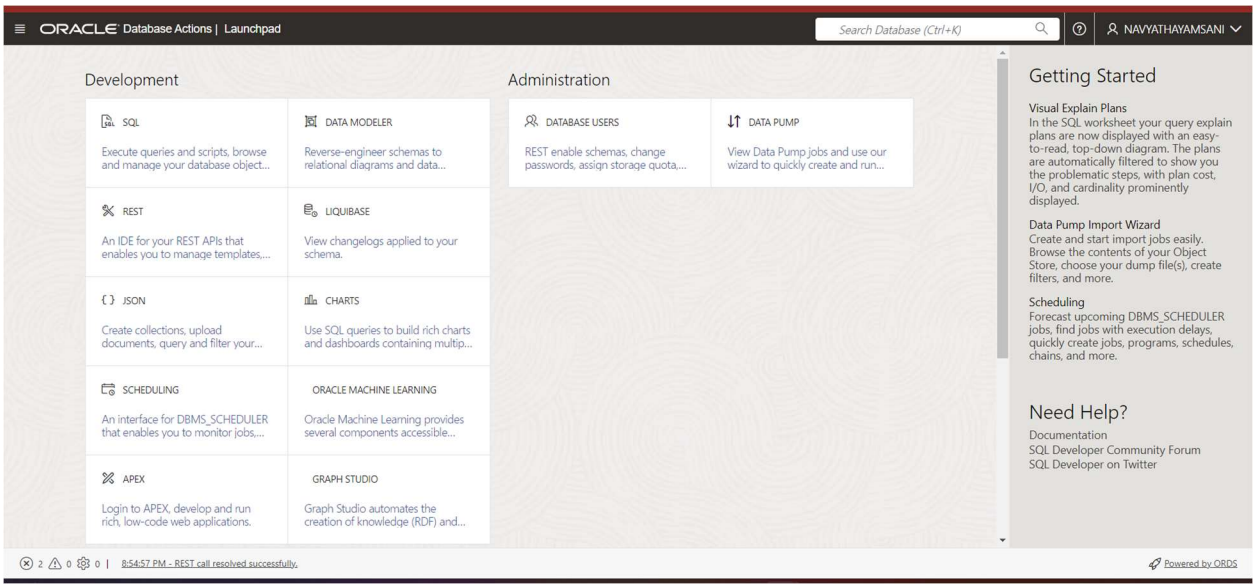


The below screenshot shows the Creation of a user to access the DB, where we need to provide the username, password, and whether web access is required or not.

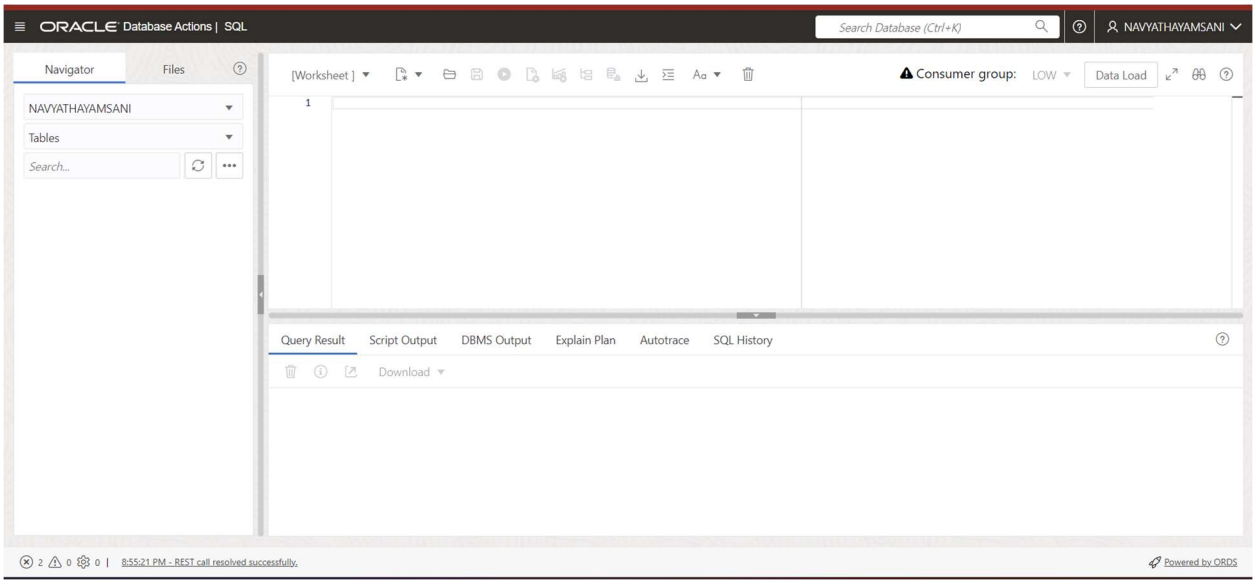

ORACLE Database Actions | Database Users
User Management
Search Database (Ctrl+K)
ADMIN
Current User
ADMIN
REST Enabled
Graph Enabled
ORDS Alias: admin
Password Expires in 359 days
https://ga9bd16b430e9f4-navyathayamsanidb.adb.us-chicago-1.oraclecloudapps.com/ords/admin
All Users
Search by User Name
Filter by
Sort by
ADBSNMP
ADMIN
REST Enabled
Graph Enabled
ORDS Alias: admin
Create User
User
2 Granted Roles
User Name *
NAVYATHAYAMSANI
Quota on tablespace DATA
Use default quota
Password *
Password Expired (user must change)
Confirm Password *
Account is Locked
Graph
OML
Web Access
Web access advanced features
Show code
Create User
Cancel
8:48:01 PM - REST call resolved successfully.
Powered by ORDS


ORACLE Database Actions | Database Users
User Management
Search Database (Ctrl+K)
ADMIN
Current User
ADMIN
REST Enabled
Graph Enabled
ORDS Alias: admin
Password Expires in 359 days
https://ga9bd16b430e9f4-navyathayamsanidb.adb.us-chicago-1.oraclecloudapps.com/ords/admin/_sdw/
All Users
Create User
NAVYATHAYAMSANI
Filter by
Sort by
Page Size: 20
Sort by
User Name: ASC
NAVYATHAYAMSANI
REST Enabled
ORDS Alias: navyathayamsani
Password Expires in 359 days
https://ga9bd16b430e9f4-navyathayamsanidb.adb.us-chicago-1.oraclecloudapps.c...
Page Size: 20
8:51:40 PM - REST call resolved successfully.
Powered by ORDS

Here is the dashboard after creating the user to choose the platform.

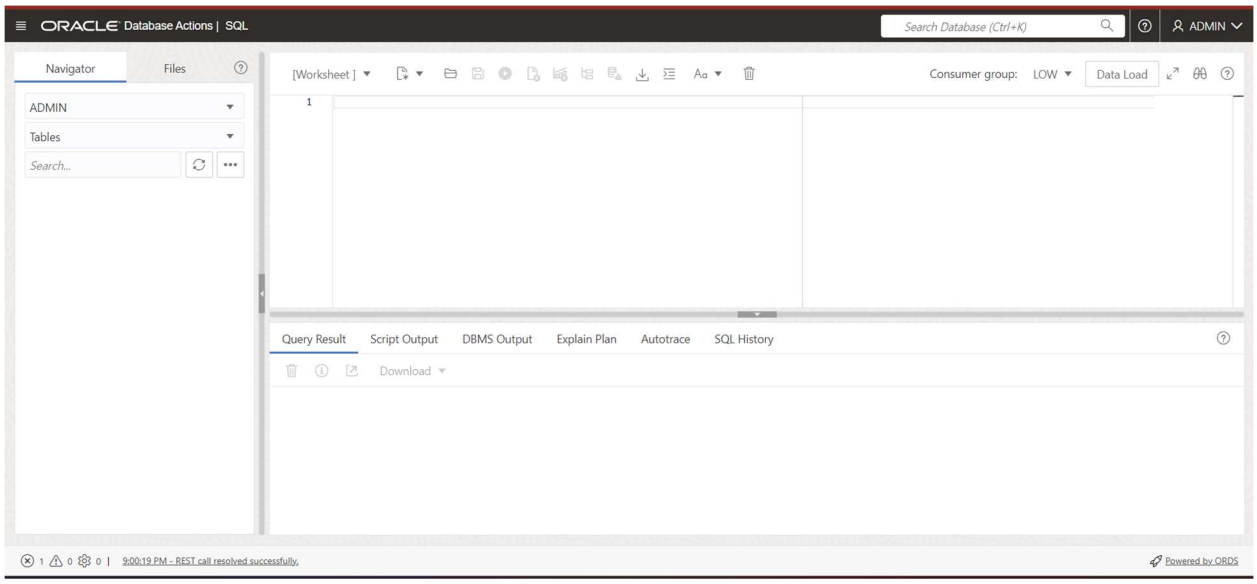


After creating the Database user, here is the SQL worksheet of the user where the user can start writing SQL Queries.

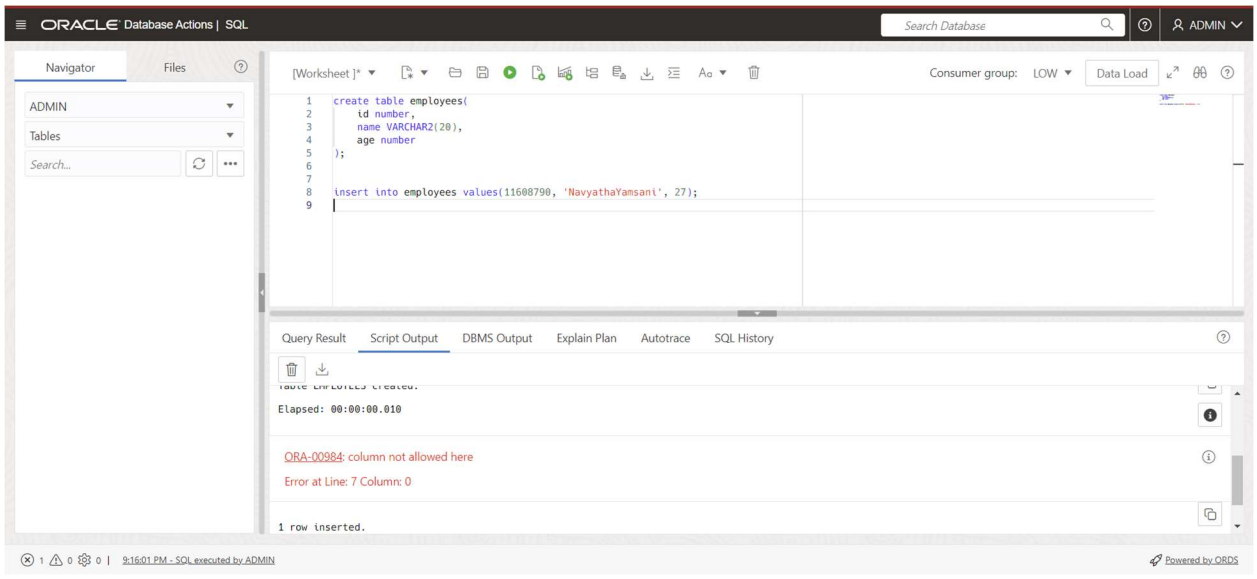


Whenever we create an Autonomous database, by default there will be an admin user who can

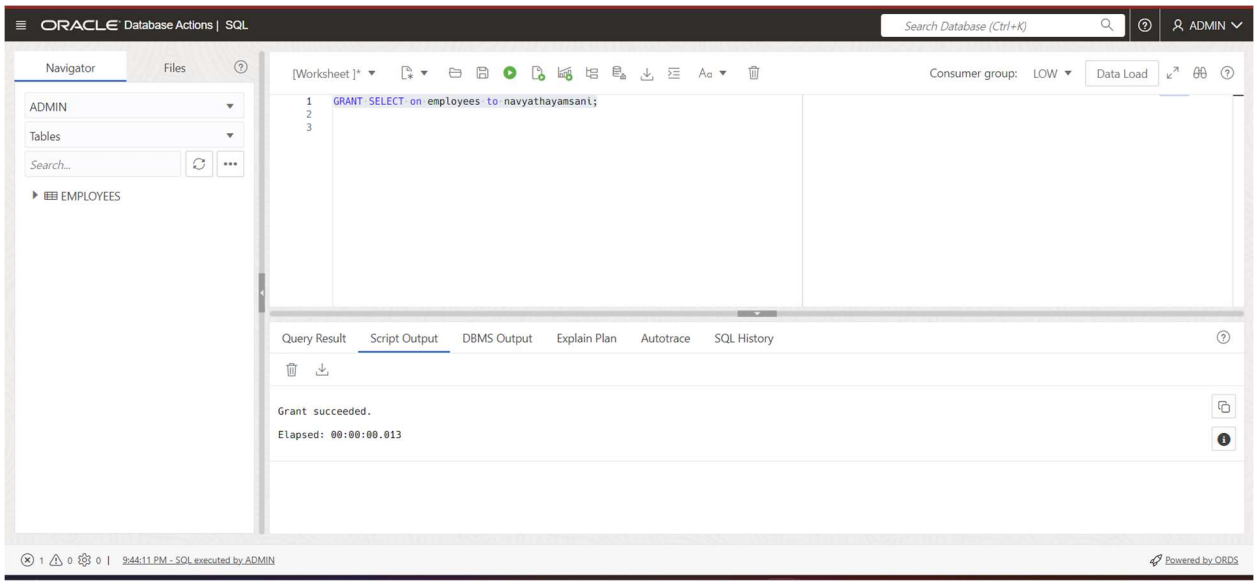
grant permissions to all other users to access the database.



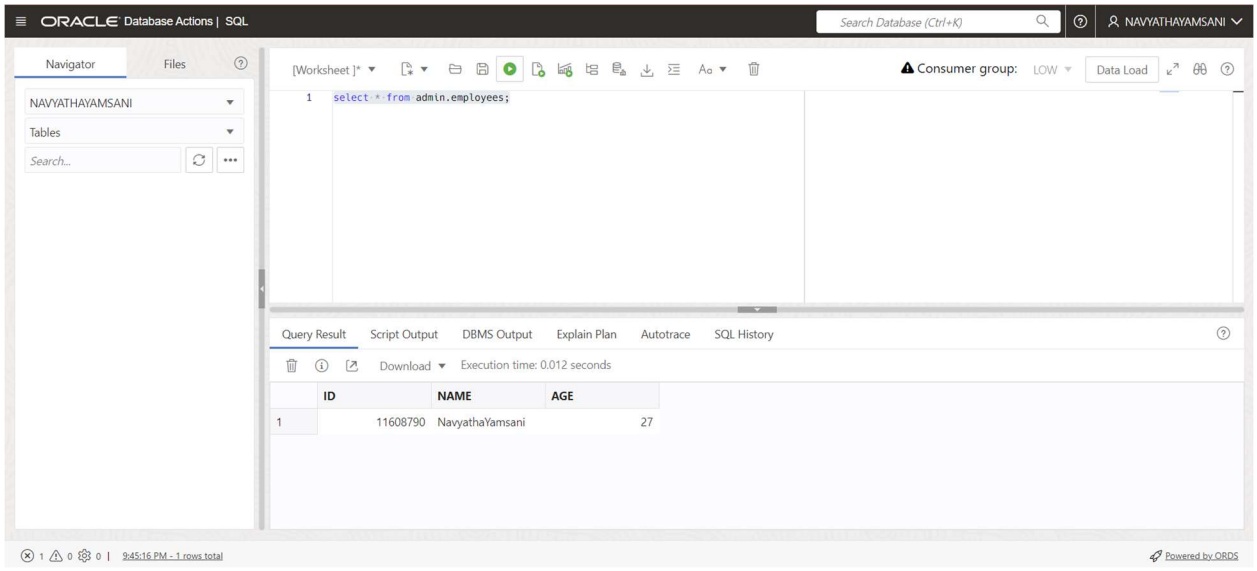
Created a table of employees and inserted a row in the employees' table through the ADMIN user.



Granted access to NAVYATHAYAMSANI USER on the employees' table.



Selected the rows from the employee table created by the ADMIN user and accessed by the NAVYATHAYAMSANI user. It demonstrates the distributed DB environment.



Individual contribution:

As a team, we (Navyatha Yamsani, Akhila Battula, Akhil Boga, Krishna Praveen Velagapalli, Rakshith Dyavari Shetty) have worked together on the task given. All of us initially worked on various assumptions, each of us drafted an ER diagram and then we consolidated all the points into one version with all the entities, attributes, and cardinalities which is presented in the submission. More specifically in the final version our work is as-

Akhil Boga worked on the entities and attributes for the library, Sponsor.

Akhila Battula worked on Books, Publisher.

Krishna Praveen Velagapalli worked on Vendors and authors.

Navyatha Yamsani worked on Admin and Users.

Rakshith Dyavari Shetty worked on Staff, Reports.

The project description is drafted alongside the ER diagram. We have used a Lucid chart to create the ERD.