

How to implement and use a database?

Heli Helskyaho, Matias Helskyaho

KCDC 2024



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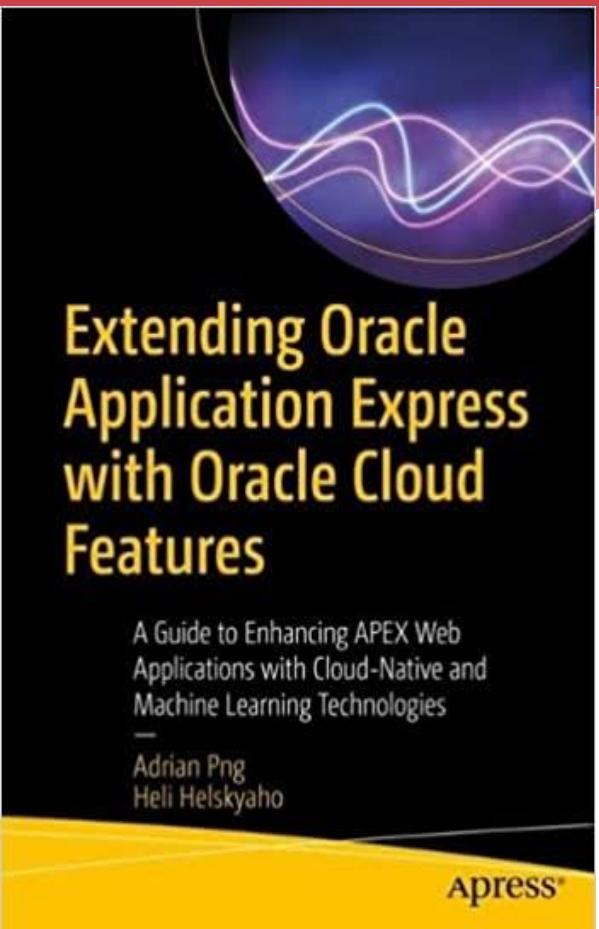
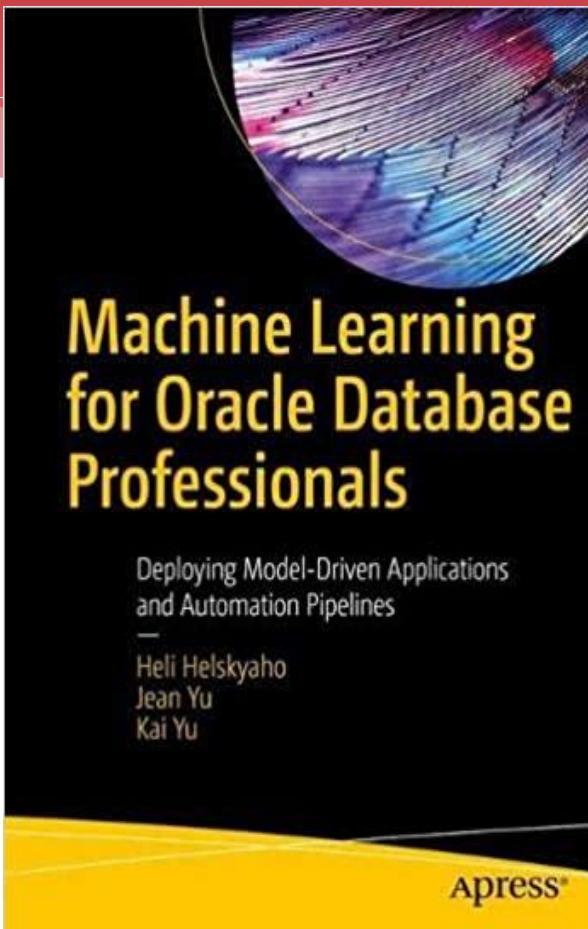
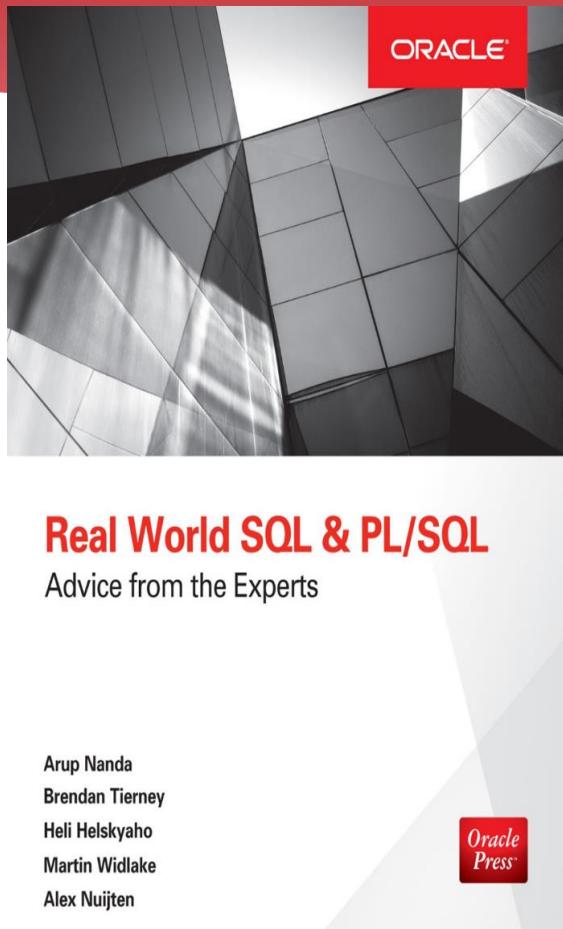
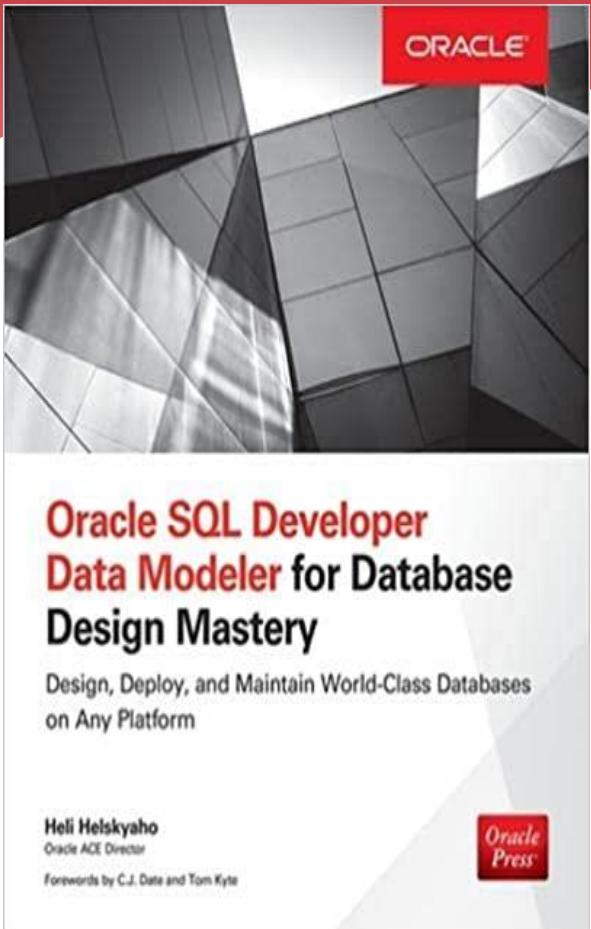
Introduction, Heli



- * Graduated from University of Helsinki (Master of Science, computer science), currently a doctoral student, researcher and lecturer (databases, Multi-model/Converged Databases) at University of Helsinki
- * Worked with Oracle products since 1993, worked for IT since 1990
- * Data and Database!
- * CEO for Miracle Finland Oy
- * Oracle ACE Director
- * Public speaker and an author
- * Author of the book Oracle SQL Developer Data Modeler for Database Design Mastery (Oracle Press, 2015), co-author for Real World SQL and PL/SQL: Advice from the Experts (Oracle Press, 2016), Machine Learning for Oracle Database Professionals: Deploying Model-Driven Applications and Automation Pipelines (Apress, 2021), and Extending Oracle Application Express with Oracle Cloud Features: A Guide to Enhancing APEX Web Applications with Cloud-Native and Machine Learning Technologies (Apress, 2022)



Books



Matias

- * Consultant
 - * Miracle Finland Oy
- * Who am I?
 - * On IT since birth
 - * Professionally a couple of years
 - * OCI, networks, IOT, ML, analytics,..
- * Hobbies
 - * Love learning cool stuff
 - * Playing with tech devices

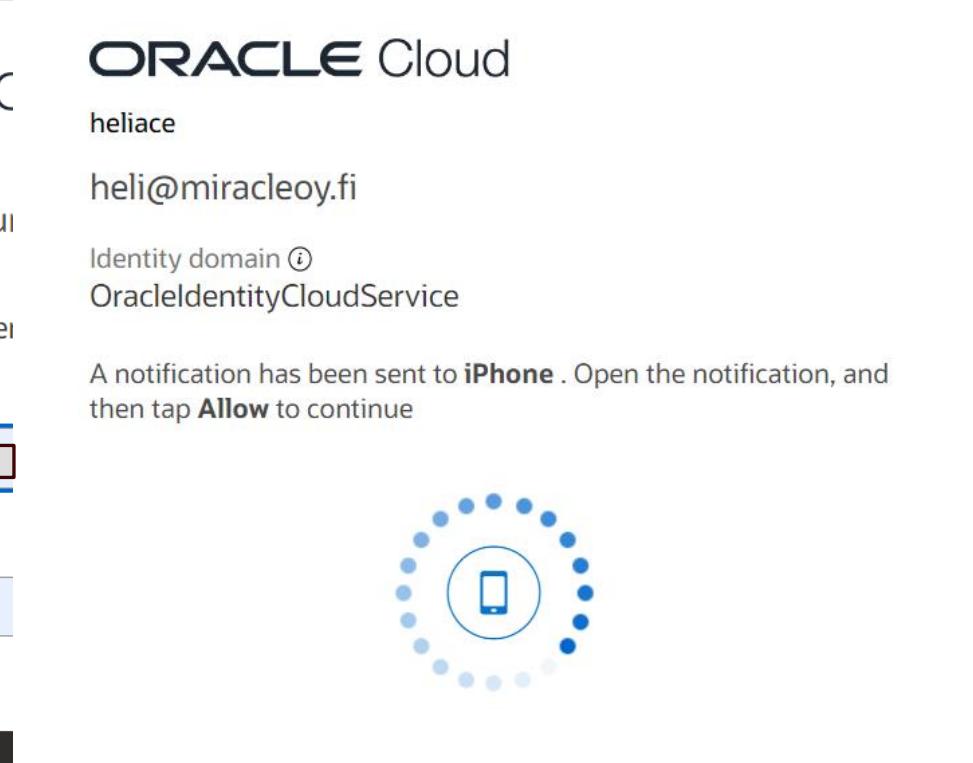
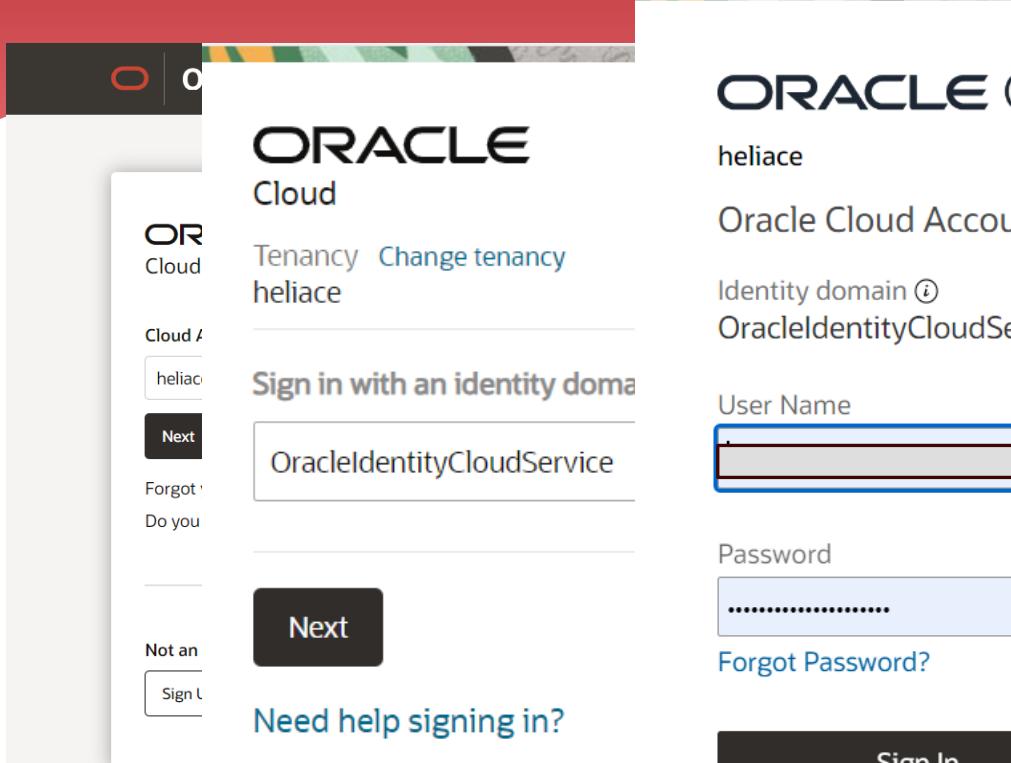


Oracle ACE
Pro

Connecting to the OCI tenancy

* Cloud.oracle.com

Connecting to the OCI tenancy



ORACLE Cloud

Tenancy Change tenancy heliace

Sign in with an identity domain

OracleIdentityCloudService

User Name

Password

Forgot Password?

Sign In

Need help signing in?

ORACLE Cloud

heliace

Oracle Cloud Account

Identity domain ⓘ OracleIdentityCloudService

A notification has been sent to **iPhone**. Open the notification, and then tap **Allow** to continue

Show alternative login methods

Creating an Autonomous Database

The screenshot shows the Oracle Cloud interface with the following details:

- Header:** Oracle Cloud logo, search bar ("Search resources, services, documentation, and Marketplace"), location "Germany Central (Frankfurt)", and various navigation icons.
- Left Sidebar:** Navigation menu with categories like Home, Compute, Storage, Networking, Oracle Database (selected), Databases, Analytics & AI, Developer Services, Identity & Security, Observability & Management, Hybrid, Migration & Disaster Recovery, and Billing & Cost Management.
- Main Content:** Title "Oracle Database".
 - Overview:** Links to Oracle Exadata Database Service on Dedicated Infrastructure, Data Safe - Database Security, and Related services (APEX Application Development, SQL Worksheet, Database Management, Migrations, Data Integration, Streaming, HeatWave, Oracle NoSQL Database).
 - Autonomous Database:** Sub-links include Autonomous Database, Autonomous JSON Database, and Autonomous Transaction Processing.
 - Globally Distributed Autonomous Database:** Sub-link is Autonomous Dedicated Infrastructure.
 - Autonomous Dedicated Infrastructure:** Sub-link is Oracle Base Database Service.
- Right Sidebar:** Help section with links to Autonomous Databases, Oracle Base Database Service, Oracle Exadata Database Service on..., and All Oracle Database Documentation.

Overview » Autonomous Database » Autonomous Databases

Autonomous Database

Autonomous Database

Dedicated infrastructure

Autonomous Container Database

Autonomous Exadata VM Cluster

Exadata Infrastructure

Resources

Autonomous Database software images

Key Stores

List scope

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Autonomous Databases *in heliae (root) compartment*

Autonomous Database delivers fast performance and requires no database administration. It performs all routine database maintenance tasks without human intervention while the system is running. [Learn more](#).

Create Autonomous Database						
Display name	State	Compute	Storage ▾	Workload type	Disaster recovery	Created
APEXLinkedIn <small>Always Free</small>	● Starting	Included <small>i</small>	Included <small>i</small>	APEX	—	Mon, Mar 4, 2024, 10:25:18 UTC

[Overview](#) » [Autonomous Database](#) » Autonomous Databases

Autonomous Database

Autonomous Database

Dedicated infrastructure

[Autonomous Container Database](#)[Autonomous Exadata VM Cluster](#)[Exadata Infrastructure](#)

Resources

[Autonomous Database software images](#)[Key Stores](#)

List scope

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Autonomous Databases *in heliae (root) compartment*

Autonomous Database delivers fast performance and requires no database administration. It performs all routine database maintenance tasks without human intervention while the system is running. [Learn more.](#)

Create Autonomous Database						
Display name	State	Compute	Storage	Workload type	Disaster recovery	Created
APEXLinkedIn <small>Always Free</small>	● Starting	Included <small>i</small>	Included <small>i</small>	APEX	—	Mon, Mar 4, 2024, 10:25:18 UTC



Create Autonomous Database

[Help](#)

Provide basic information for the Autonomous Database

Compartment

AIML

heliaece (root)/AIML

Display name

Orders23aiATP

A user-friendly name to help you easily identify the resource.

Database name

Orders23ai

The name must contain only letters and numbers, starting with a letter. Maximum of 30 characters.



Choose a workload type

[Create Autonomous Database](#)[Save as stack](#)[Cancel](#)

Create Autonomous Database

[Help](#)

Create administrator credentials ⓘ

Username *Read-only*

ADMIN

ADMIN username cannot be edited.

Password

.....

Confirm password

.....

Choose network access

[Create Autonomous Database](#)[Save as stack](#)[Cancel](#)

Create Autonomous Database

[Help](#)[Add customer contact](#)[Hide advanced options](#)[Encryption key](#)[Maintenance](#)[Tools](#)[Tags](#)

Choose encryption management settings

 Encrypt using an Oracle-managed key

Oracle manages the encryption key.

 Encrypt using a customer-managed key in this tenancyYou must have access to a valid encryption key in this tenancy. [Learn more](#). Encrypt using a customer-managed key located in a different tenancyYou must have access to a valid encryption key in a different tenancy. [Learn more](#).[Create Autonomous Database](#)[Save as stack](#)[Cancel](#)

[Overview](#) » [Autonomous Database](#) » Autonomous Database details

AVAILABLE

Announcements

- New Feature: Add geo-redundancy to your disaster recovery setup with multiple cross-region peers. [Learn more.](#)
- Learn about other [new features in Autonomous Database here.](#)

Orders23aiATP[Database actions](#) ▾[Database connection](#)[Performance Hub](#)[Manage resource allocation](#)[More actions](#) ▾[Autonomous Database information](#)[Tool configuration](#)[Tags](#)**General information****Database name:** Orders23ai**Workload type:** Transaction Processing**Compartment:** heliae (root)/AIML**OCID:** ...kh7xoq [Show](#) [Copy](#)**Created:** Sat, Jun 15, 2024, 10:57:23 UTC**License type:** License included**Disaster recovery** **Role:** -**Local:** Not enabled**Cross-region:** Not enabled**Backup**Automatic backup retention period: 60 days. [Edit](#)

AVAILABLE

Autonomous Database information

Tool configuration

Tags

Edit tool configuration

The edit tool configuration option is not available for Always Free Autonomous Database instances.

Tools	Description	Status
Oracle APEX	Oracle APEX is a low-code development platform that you can use to build scalable, secure enterprise applications that can be deployed anywhere. Learn more .	Enabled
Database actions	Oracle database actions is a web-based interface that uses Oracle REST Data Services (ORDS) to provide development, data tools, administration, and monitoring features for an Oracle Autonomous Database. Learn more .	Enabled
Graph Studio	Graph Studio automates the creation of knowledge (RDF) and property graphs and includes interactive tooling for query, analysis, and visualization of these graphs in the Autonomous Database. You must log in as a graph-enabled user to access Graph Studio. Create this user in database actions. Learn more .	Enabled

Overview » Autonomous Database » Autonomous Database details



AVAILABLE

Announcements

- New Feature: Add geo-redundancy to your disaster recovery setup with multiple cross-region peers. [Learn more.](#)
- Learn about other [new features in Autonomous Database here.](#)

Orders23aiATP

Database actions ▾

Database connection

Performance Hub

Manage resource allocation

More actions ▾

Autonomous Database information

Tool configuration

Tags

Defined tags (2)

- Oracle-Tags.CreatedBy: oracleidentitycloudservice/heli@miracleoy.fi
 Oracle-Tags.CreatedOn: 2024-06-15T10:57:23.610Z

Stop

Restart

Restore

Create clone

Administrator password

Update license and Oracle Database edition

Manage encryption key

Resources

Metrics

[View all database metrics](#)
[View audit and logs](#)

Start time

End time

Quick selects

ORACLE Database Actions | SQL

[Worksheet] Search...  Warning

Logged in as ADMIN user
ADMIN user is not recommended for regular development work

Learn more Create user

Navigator Files ?

ADMIN All Objects Search...  ...

DBTOOLS\$EXECUTION_HISTORY
-< DBTOOLS\$EXECUTION_HISTORY_PK
↓ DBTOOLS\$EXECUTION_HISTORY_SEC

1

SQL History 

1 SQL History Displays a running history of statements and scripts executed. It can be turned off and on in Preferences.

Next

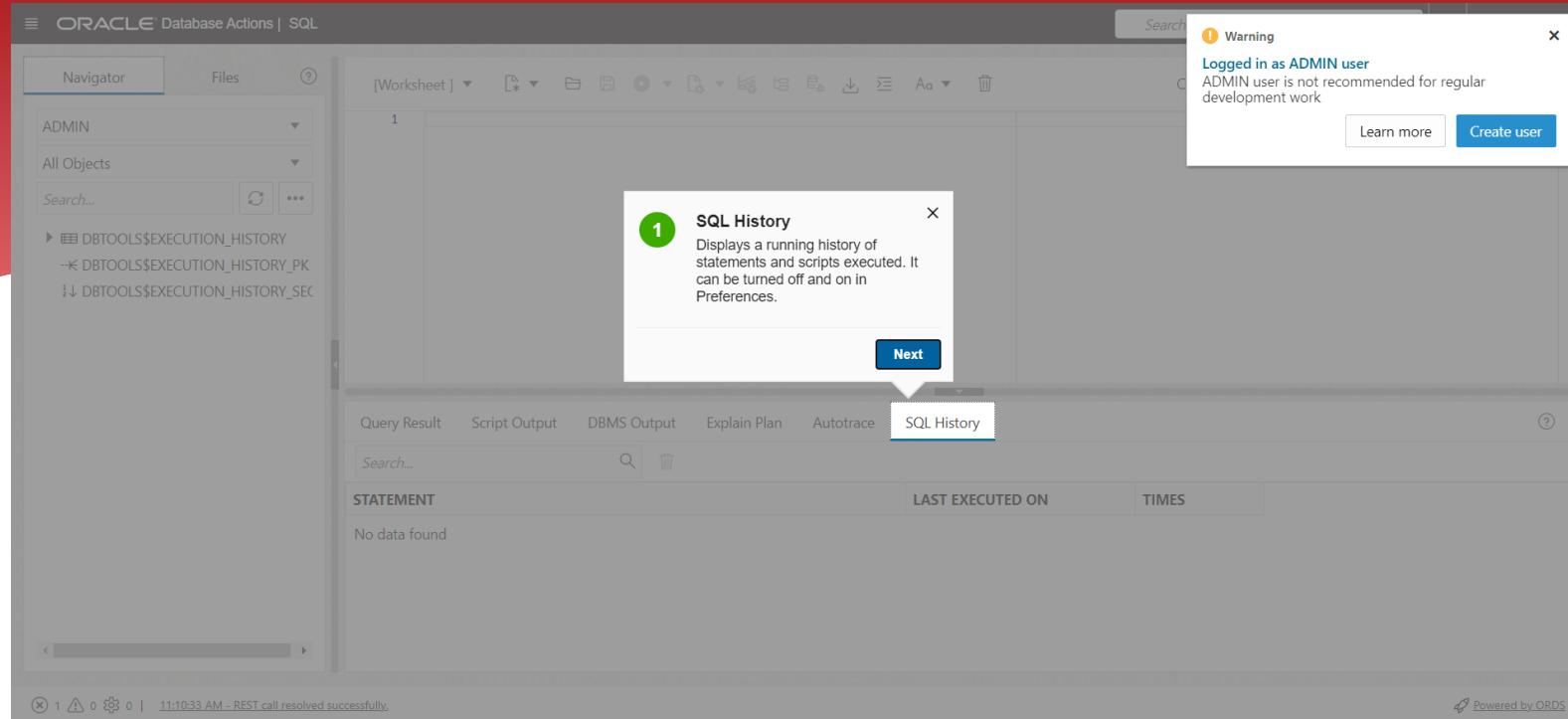
Query Result Script Output DBMS Output Explain Plan Autotrace SQL History ?

Search...  

STATEMENT	LAST EXECUTED ON	TIMES
No data found		

Powered by ORDS

1 0 0 | 11:10:33 AM - REST call resolved successfully.



The screenshot shows the Oracle Database Actions interface. The top navigation bar includes 'Navigator', 'Files', 'User Management', and a search bar. A warning dialog box is open, stating 'Logged in as ADMIN user' and 'ADMIN user is not recommended for regular development work'. The main area displays the 'Current User' section for 'ADMIN' (ORDS Alias: admin, REST Enabled, Graph Enabled) and a link to 'https://[REDACTED]oraclecloudapps.com/ords/admin/_sdw/'. Below this is a grid of 'All Users' with entries for 'ADBSNMP', 'ADMIN' (repeated), 'ADB_APP_STORE', and 'DCAT_ADMIN'. Each user entry includes a profile icon, the user name, and a 'More' options menu. The bottom status bar shows '1 0 0 | 11:11:07 AM - REST call resolved successfully.' and 'Powered by ORDS'.

The screenshot shows the Oracle Database Actions interface with the following details:

- Top Bar:** Includes "Navigator", "Files", "Search", "[Worksheet]", and "User Management".
- Warning Alert:** A modal window titled "Warning" states "Logged in as ADMIN user" and "ADMIN user is not recommended for regular development work".
- User Management Section:** Shows the "Current User" as "ADMIN" (REST Enabled, Graph Enabled) with ORDS Alias: admin. It also displays "All Users" with a search bar and a table listing users:
 - ADBSNMP:** REST Enabled, Graph Enabled.
 - ADB_APP_STORE:** REST Enabled, Graph Enabled.
 - ADMIN:** REST Enabled, Graph Enabled. ORDS Alias: admin. Password Expires in 359 days. URL: https://[REDACTED].oraclecloudapps.com/ords/admin/_sdw/.
 - DCAT_ADMIN:** REST Enabled, Graph Enabled.
- Bottom Status Bar:** Shows "Page Size: 20", "Sort by: User Name: ASC", and a timestamp "11:11:07 AM".
- Bottom Footer:** Shows "Powered by ORDS".

Current User



ADMIN REST Enabled Graph Enabled

ORDS Alias: admin

⌚ Password Expires in 359 days

[https://\[REDACTED\]frankfurt-1.oraclecloudapps.com/ords/admin/_sdw/](https://[REDACTED]frankfurt-1.oraclecloudapps.com/ords/admin/_sdw/)

All Users

[+ Create User](#)

APPUSER



Filter by

Sort by

Page Size: 20

Sort by



APPUSER REST Enabled Graph Enabled OML Enabled

ORDS Alias: appuser

⌚ Password Expires in 359 days

[https://\[REDACTED\]frankfurt-1.oraclecloudapps.com/ords/...](https://[REDACTED]frankfurt-1.oraclecloudapps.com/ords/...)



Page Size: 20

Powered by ORDS

⊗ 1 ⚠ 0 ⚡ 0 | 11:15:26 AM - REST call resolved successfully.

English - English



Sign-in

Username

appuser

Password

.....



Sign in

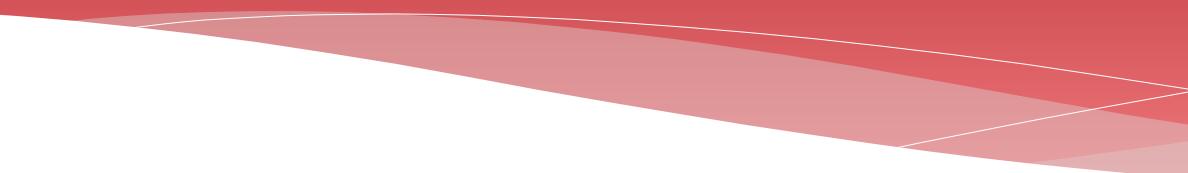
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Running the DDLs

If you forgot the URL...



AVAILABLE

Edit tool configuration

The edit tool configuration option is not available for Always Free Autonomous Database instances.

Tools	Access
Oracle APEX Oracle APEX is a low-code development platform that you can use to build scalable, secure enterprise applications that can be deployed anywhere. Learn more .	Public access URL: ...urt-1.oraclecloudapps.com/ords/apex Show Copy
Database actions Oracle database actions is a web-based interface that uses Oracle REST Data Services (ORDS) to provide development, data tools, administration, and monitoring features for an Oracle Autonomous Database. Learn more .	Public access URL: ...clecloudapps.com/ords/sql-developer Show Copy
Graph Studio Graph Studio automates the creation of knowledge (RDF) and property graphs and includes interactive tooling for query, analysis, and visualization of these graphs in the Autonomous Database. You must log in as a graph-enabled user to access Graph Studio. Create this user in database actions. Learn more .	Public access URL: ...-1.oraclecloudapps.com/graphstudio/ Show Copy
Oracle Machine Learning user interface The Oracle Machine Learning user interface provides immediate access to the Oracle Machine Learning components and functionality on Autonomous Database, including OML Notebooks, OML AutoML UI, OML Models and template example notebooks. Learn more	Public access URL: ...rankfurt-1.oraclecloudapps.com/oml/ Show Copy

Advanced, add the username



Pinned & Recently Visited Development Data Studio Downloads Administration Related Services Monitoring

SQL Data Modeler REST Liquibase JSON Charts Scheduling JavaScript Oracle Machine Learning APEX Graph Studio

SQL

The SQL worksheet is where most of your work will be performed. Running SQL queries and scripts, creating and browsing objects, loading data, exporting data to CSV or JSON, and so much more. Your day will often start and end in the SQL interface.

Worksheet ▾ Consumer group: LOW ▾ Data Load:

```
1 drop table demo_emps;
2 drop materialized view demo_emps_mv;
3
4 create table demo_emps (
5   id number primary key,
6   name varchar2(255),
7   sal number
8 );
9
10 insert into demo_emps values(1, 'martin', 100);
11
```

Query Result Script Output DBMS Output Explain Plan Autotrace SQL History

NAME	MAX_SAL_CNT
martin	100
sally	200

Elapsed: 00:00:00.004
2 Rows selected.

Powered by ORDS

Documentation

1 0 0 | 5:53:31 PM - REST call failed.

Powered by ORDS

≡ ORACLE Database Actions | SQL

Search Database ? APPUSER ▾

Navigator Files ?
APPUSER
Tables
Search... ⚡

[Worksheet] * Consumer group: LOW Data Load

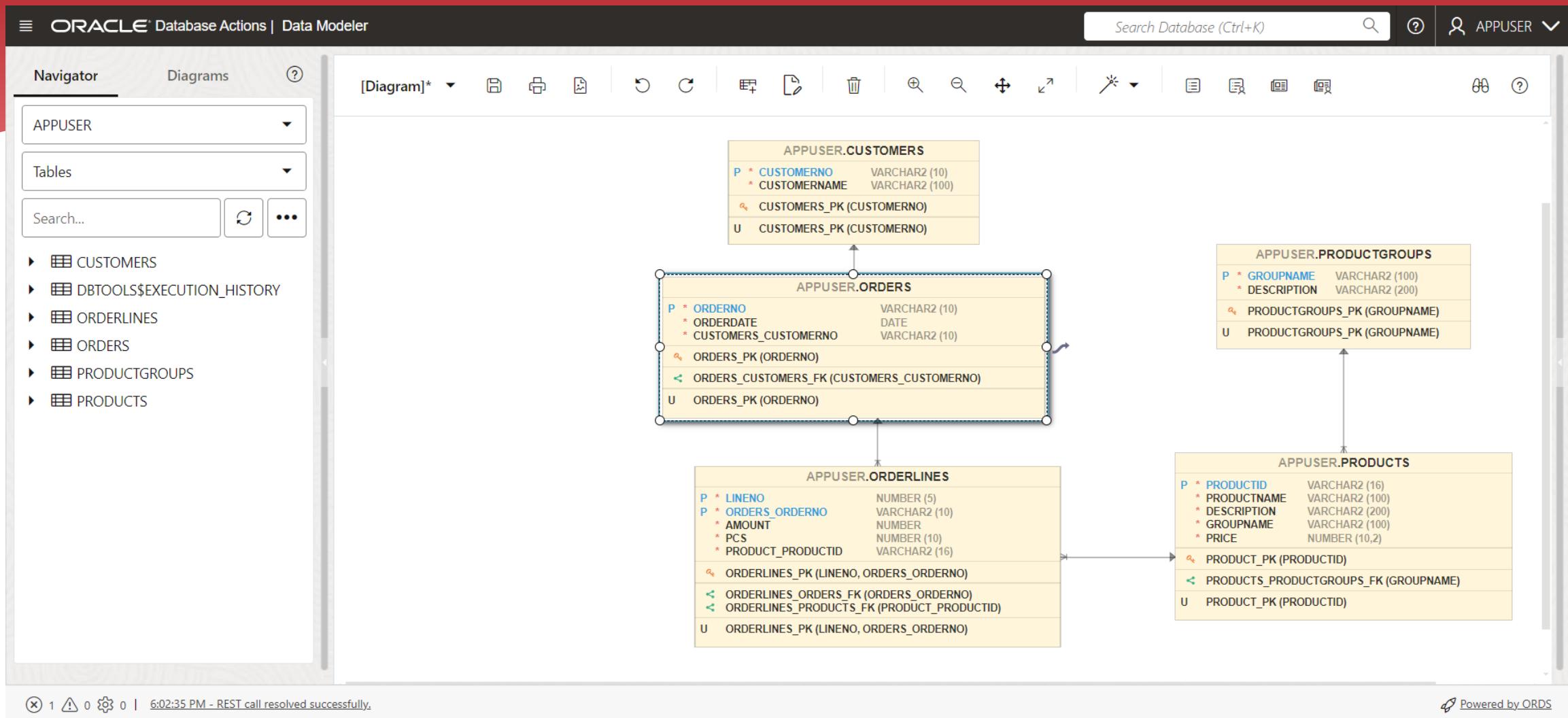
```
1 -- Generated by Oracle SQL Developer Data Modeler 23.1.0.087.0806
2 -- at: 2024-06-25 20:25:31 EEST
3 -- site: Oracle Database 21c
4 -- type: Oracle Database 21c
5
6
7
8 -- predefined type, no DDL - MDSYS.SDO_Geometry
9
10 -- predefined type, no DDL - XMLTYPE
11
12 CREATE TABLE customers (
13     customerno VARCHAR2(10 BYTE) NOT NULL,
14     customername VARCHAR2(100) NOT NULL
15 );
16
```

Query Result Script Output DBMS Output Explain Plan Autotrace SQL History

Search...

STATEMENT	LAST EXECUTED ON	TIMES
No data found		

× 1 ⚡ 0 ⚙ 0 | 5:59:43 PM - REST call resolved successfully. 



The screenshot displays two instances of the Oracle Database Actions application side-by-side. Both windows have a dark header bar with the text "ORACLE Database Actions | SQL".

The left window's sidebar shows the following navigation paths:

- APPUSER
- Tables
- Search...
- CUSTOMERS
 - CUST... Open
 - CUST... Edit...
- DBTOOL
- ORDERL
- ORDERS
- PRODUCT
- PRODUCT

The main workspace is a "Worksheet" tab showing the following SQL code:

```
-- Generated by Oracle
-- at: 2024-0
-- site: Oracle
-- type: Oracle

-- predefined type, no
-- predefined type, no

CREATE TABLE customers
    customerno  VARCHAR
    customername VARCHAR
);
```

The right window has a similar structure but with a different context menu open over the "Edit..." option in the CUSTOMERS section of the sidebar. The menu items are:

- Open
- Edit...
- Add
- Use as Template
- REST
- Data Loading
- Quick DDL

≡ ORACLE Database Actions | SQL

Search Database (Ctrl+K) APPUSER

Navigator Files

APPUSER Tables

Search...

[Worksheet]*

APPUSER.CUSTOMERS

Columns

Data CUSTOMERNO CUSTOMERNAME

No items to display.

Constraints Grants Statistics Triggers Dependencies Details Partitions Indexes

Query Result

Close

✖ 1 ⚠ 0 ⚡ 0 | 6:07:46 PM - Code execution finished.

Inserting data from a file

☰ ORACLE Database Actions | SQL

Search Database (Ctrl+K)   APPUSER 

 Development	 Data Studio	 Downloads	 Administration	 Related Services	 Monitoring
Overview	Data Studio Overview	Download Oracle Instant Client	Database Users	SODA	Real Time SQL Monitor
SQL	Data Load	Download SODA Drivers	Data Pump	Oracle Machine Learning RESTful services	
Data Modeler	Data Marketplace	Download Microsoft Excel/Google Sheets add-in			
REST	Catalog				
Liquibase	Data Insights				
JSON	Data Analysis				
Charts	Data Share				
Scheduling					
JavaScript					
 Oracle Machine Learning					
 APEX					
 Graph Studio					

Overview

Data Load >

Analysis

Insights

Catalog

Marketplace

Data Share >

LOAD DATA

Import data into your autonomous database.

LINK DATA

Leave your data in place and let your autonomous database access it.

FEED DATA

Set up an ongoing feed of new data into your autonomous database.

CONNECTIONS

Manage URLs, Shares and Data Catalogs.

Table and View Loads

Refresh Off

No items to display.

https://g4511f964658e31-orders23ai.adb.eu-frankfurt-1.oraclecloudapps.com/ords/appuser/_sdw/?nav=adpdi&adpdi=adp-data-load#

Powered by ORDS

Overview

Data Load

Analysis

Insights

Catalog

Marketplace

Data Share

This PC

3D Objects

Desktop

Documents

Downloads

Music

Pictures

Videos

Windows (C:)

HP_RECOVERY (D:)

HP_TOOLS (E:)

Heli (F:)

Name

Date modified

Type

Size

Status A...

Heavy Synonyms, H...

Micro Focus Fil...

KIRJAA-ALTISTUS -...

Altistumiset Tuotant...

>>

Name	Date modified	Type	Size
Customers	25.6.2024 21:36	Microsoft Excel Co...	1 KB
Orderlines	25.6.2024 21:38	Microsoft Excel Co...	1 KB
Orders	25.6.2024 21:38	Microsoft Excel Co...	1 KB
Productgroups	25.6.2024 21:36	Microsoft Excel Co...	1 KB
Products	25.6.2024 21:37	Microsoft Excel Co...	1 KB

File name: Customers

Muokatut tiedostot

Open

Cancel



Drag and drop here to upload

or

Select Files

ORACLE Database Actions | Data Load

Search Database (Ctrl+K) APPUSER

Overview Data Load Analysis Insights Catalog Marketplace Data Share

This PC Name Date modified Type Size

Customers	25.6.2024 21:36	Microsoft Excel Co...	1 KB
Orderlines	25.6.2024 21:38	Microsoft Excel Co...	1 KB
	25.6.2024 21:38	Microsoft Excel Co...	1 KB

Heavy Synonyms, H... Micro Focus Fil KIRJAA-ALTISTUS ... Altistumiset Tuotant... Search Database (Ctrl+K) APPUSER

ORACLE Database Actions | Data Load

Search Database (Ctrl+K) APPUSER

Search Database (Ctrl+K) APPUSER

Local File Cloud Store Share Database AI Source File System

Load data from local files

Start Stop

Consumer Group: HIGH

Customers.csv (130B) Review Settings

Create Table: CUSTOMERS_1

Remove

https://g4511f964658

Over

Data

Analy

Insig

Catal

SQL

Mark

Data

Load Data from Local File Customers.csv (130B)

Table

Option

Create Table

Name

CUSTOMERS_1

Settings Template

Properties

Encoding

AL32UTF8 - Unicode 9.0 Universal Character Set (UC

Text enclosure

"

Field delimiter

Semicolon

 Column header row

1

Start processing data
at row

2

 Convert invalid numeric column data to null Newlines included in data values

Hide Properties

Mapping

Search...



Quick Filter:

Columns

Expressions

Errors

Bulk Edit

Close

Over

Data

Analy

Insig

Catal

SQL

Mark

Data

Load Data from Local File Customers.csv (130B)

Settings

Over

Data

Analy

Insig

Catal

SQL

Mark

Data

Table

Option

Create Table

Name

CUSTOMERS_1

Settings Template ▾

Preview

Create Table

Hide Properties

Insert into Table

Replace Data

Drop Table and Create New Table

Merge into Table

 Newlines included in data values

Text enclosure

"

Field delimiter

Semicolon

Start processing data
at row

2

 Convert invalid numeric column data to null

Mapping

Search...



Quick Filter:

Columns

Expressions

Errors

Bulk Edit



Close

2 0 0 | 6:41:04 PM - REST call resolved successfully.

Powered by ORDS

The screenshot shows three overlapping windows of the Oracle Database Actions | Data Load interface. The top window displays a progress bar for "Load Data from Local File Customers.csv (130B)". The middle window shows the main Data Load screen with sections for LOAD DATA, LINK DATA, FEED DATA, and CONNECTIONS. The bottom window provides a detailed view of the current load task for the CUSTOMERS table.

ORACLE Database Actions | Data Load

Search Database (Ctrl+K) APPUSER

Load Data from Local File Customers.csv (130B)

OVERVIEW

DATA LOAD

ANALYSIS

INSIGHTS

CATALOG

MARKETPLACE

DATA SHARE

SETUP

PREVIOUS

OVERVIEW

DATA

ANALYSIS

INSIGHTS

CATALOG

MARKETPLACE

DATA SHARE

LOAD DATA

LINK DATA

FEED DATA

CONNECTIONS

Table and View Loads

CUSTOMERS • 2 columns

Insert into Table • Customers.csv
Directory • STAGE\$APPUSER_G4D33VCOTMW
00:05 PREPARING

Refresh Off

Query

Stop

Overview

Data Load >

Analysis

Insights

Catalog

Marketplace

Data Share >

New_Analysis

APPUSER

Query

No Tables Found

My Report_Report-0

1 SELECT * FROM "APPUSER"."CUSTOMERS"

Run

Faceted Visual

CUSTOMERNO



CUSTOMERNAME



Query Result

Explain Plan

Autotrace



CUSTOMERNO

CUSTOMERNAME

1

James

2

Michael

3

Mary

2 0 0 | 6:46:32 PM - REST call resolved successfully.

Powered by ORDS

Load Data

- * Customers
- * ProductGroups
- * Products
- * Orders
- * Orderlines

- * Make sure to select Insert into table! Check the settings!

Query

The screenshot shows the ORACLE Database Actions | Data Load interface. On the left, the navigation menu includes: Overview, Data Load (selected), Home, Load Data, Link Data, Live Feed, Connections, Analysis, Insights, Catalog, Marketplace, and Data Share. The main area displays a query titled "New_Analysis" for user "APPUSER". The query is:

```
1 SELECT * FROM "APPUSER"."ORDERLINES"
```

The results are shown in a table:

LINENO	ORDERS_ORDERNO	AMOUNT	PCS	PRODUCT_PRODUCTID
1	100	300	3	10
1	200	2800	8	40
1	300	400	1	20

On the right, there are visualizations for columns LINENO, ORDERS_ORDERNO, AMOUNT, PCS, and PRODUCT_PRODUCTID. A red arrow points to the "Visual" toggle switch in the top right corner of the visualization panel.

ORACLE Database Actions | Data Load

Search Database (Ctrl+K)

APPUSER

New_Analysis

Save

Faceted Visual

My Report_Report-0

Run

SELECT * FROM "APPUSER"."ORDERLINES"

Lineno

Orders_OrderNo

Amount

PCS

Product_ProductID

Columns

Filters LINENO: 1,2

Query Result Explain Plan Autotrace

LINENO	ORDERS_ORDERNO	AMOUNT	PCS	PRODUCT_PRODUCTID
1	100	300	3	10
1	200	2800	8	40
1	300	400	1	20

Faceted Visual

LINENO

1 (4)

2 (1)

ORDERS_ORDERNO

100 (2)

200 (1)

300 (1)

Show More...

AMOUNT

5000 (2)

300 (1)

2800 (1)

Show More...

PCS

The screenshot shows the Oracle Database Actions interface. On the left, there's a sidebar with various navigation options like Overview, Data Load, Home, Load Data, Link Data, Live Feed, Connections, Analysis, Insights, Catalog, Marketplace, and Data Share. The Analysis option is currently selected. The main area is titled 'New_Analysis' and contains a report named 'My Report_Report-0'. The report displays a query result table with columns: LINENO, ORDERS_ORDERNO, AMOUNT, PCS, and PRODUCT_PRODUCTID. The table has three rows with values: (1, 100, 300, 3, 10), (1, 200, 2800, 8, 40), and (1, 300, 400, 1, 20). To the right of the report, there's a sidebar with facets for LINENO, ORDERS_ORDERNO, AMOUNT, and PCS. A red arrow points to the 'Faceted Visual' toggle button at the top of this sidebar.

Oracle SQL Developer Extension for VS Code

(24.1.1)

The screenshot shows the VS Code Marketplace interface with a dark theme. The search bar at the top contains the text "Oracle sql developer extension". Below the search bar, a list of extensions is displayed:

- Oracle SQL Developer Extension for VSCode** by Oracle Corporation (58K installs, 4 stars)
- Oracle Developer Tools for VS Code (SQL and PLSQL)** by Oracle Corporation (568K installs, 3.5 stars)
- oracle-plsql** by mycelo (94K installs, 5 stars)
- oracle-format** by mickeypearce (49K installs, 4.5 stars)
- Oracle JET Core** by Oracle Corporation (19K installs, 5 stars)
- SQLTools Oracle Driver** by hurly (19K installs)
- Intellisense for the Oracle Developer** by Adrian Png (19K installs, 5 stars)
- CCM Oracle PL/SQL** by Danil Reznichenko (4K installs, 5 stars)
- Oracle NoSQL Database Connector** by Oracle Corporation (9K installs, 5 stars)
- SQL Server (mssql)** by Microsoft (6.7M installs, 3.5 stars)

Each extension entry includes its name, developer, description, number of installs, average rating, and an "Install" button.

The screenshot shows the details page for the "Oracle SQL Developer Extension for VSCode" extension. The title is "Oracle SQL Developer Extension for VSCode v24.1" by Oracle Corporation (58,344 installs, 4.5 stars). The page includes the following sections:

- Extension Overview:** A brief description: "End-to-end development tools for your SQL and PL/SQL applications."
- Details:** Includes the extension icon, a play button, and the version number v24.1.
- Features:** A list of features: "Oracle SQL Developer Extension for VS Code", "Oracle Developer Tools for VS Code (SQL and PLSQL)", "oracle-plsql", "oracle-format", "Oracle JET Core", "SQLTools Oracle Driver", "Intellisense for the Oracle Developer", "CCM Oracle PL/SQL", "Oracle NoSQL Database Connector", and "Microsoft SQL Server".
- About the Oracle SQL Developer extension for VS Code:** A section describing the extension as the de-facto query, development, and administration tool for Oracle Database professionals.
- Resources:** Links to Marketplace, License, and Oracle Corporation.
- More Info:** Published: 2024-01-17, 17:38:56; Last released: 2024-06-13, 18:43:22; Identifier: oracle.sql-developer.
- Getting started:** Instructions to install the extension via the "Install" button.
- Complete Feature List:** A link to a detailed feature list.
- Connectivity:** A note about connectivity: "Everything required to connect to your database is included in the extension. If you have ..."

The screenshot shows the Visual Studio Code interface with the Marketplace extension open. A red arrow points to the 'oracle-plsql' extension, which provides PL/SQL syntax highlighting. Another red circle highlights the 'Oracle NoSQL Database Connector' extension, which allows browsing tables and running queries against NoSQL databases.

EXTENSIONS: MARKETPLACE

- Oracle sql developer extension** by Oracle Corporation (498ms)
- Oracle Developer Tools for VS Code (SQL and PLSQL)** by Oracle Corporation (568K, 3.5 stars)
- oracle-plsql** by mycelo (94K, 5 stars)
- oracle-format** by mickeypearce (49K, 4.5 stars)
- Oracle JET Core** by Oracle Corporation (19K, 5 stars)
- SQLTools Oracle Driver** by hurly (19K)
- Intellisense for the Oracle Developer** by Adrian Png (19K, 5 stars)
- CCM Oracle PL/SQL** by Danil Reznichenko (4K, 5 stars)
- Oracle NoSQL Database Connector** by Oracle Corporation (9K, 5 stars)
- SQL Server (mssql)** by Microsoft (6.7M, 3.5 stars)

Welcome

Get started with Oracle SQL Developer Extension for VS Code

Start by creating a new database connection

Navigate to SQL Developer extension

Create new database connection

Create a new database connection by expanding the **CONNECTIONS** dropdown, and click **Create Connection**.

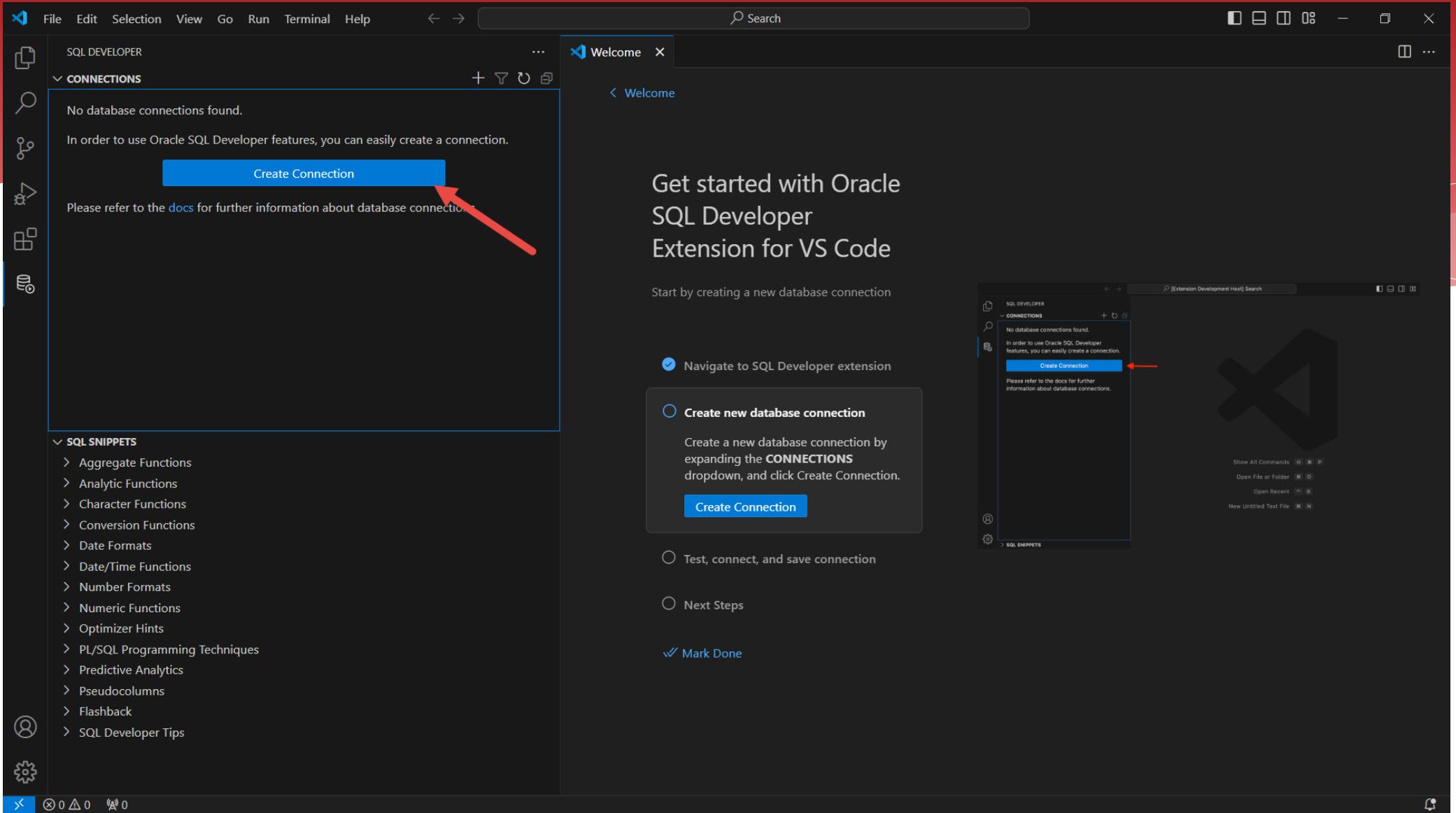
Create Connection

Test, connect, and save connection

Next Steps

Mark Done

A red arrow points to the 'Create Connection' button in the 'Create new database connection' section of the Welcome screen. A red circle highlights the 'Create Connection' button in the screenshot of the SQL Developer extension's 'CONNECTIONS' view.





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You have **€7,229.97** left in your Free Trial. When your trial is over, your account is limited to Always Free resources. [Upgrade](#) at any time.

[Learn more](#)

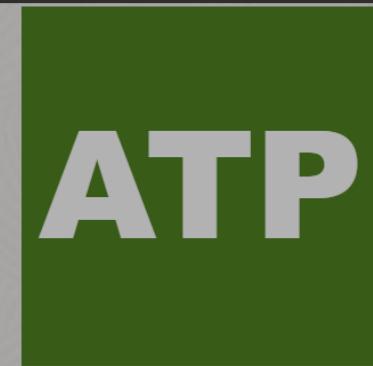
ORACLE Cloud

Search resources, services, documentation, and Marketplace

Germany Central (Frankfurt)



Help



AVAILABLE

Orders23aiATP

Database actions Databases

Autonomous Database information

General information

Database name: Orders23ai

Workload type: Transaction Processing

Compartment: heliae (root)/All

OCID: ...kh7xoq [Show](#) [Copy](#)

Created: Sat, Jun 15, 2024, 10:55:10

License type: License included

Database version: 23ai

Lifecycle state: Available

Instance type: Free [Upgrade to](#)

Character set: AL32UTF8

National character set: AL16UNI

Database connection



Connections to your Autonomous Database are secured, and can be authorized using TLS or mTLS authentication options. TLS authentication is easier to use, provides better connection latency, and does not require you to download client credentials (wallet) if any of these is true for your connections:

- You are using JDBC Thin Client (version 12.2.0.1 or higher) with JDK 8(u163+) or higher.
- You are using the Python python-oracledb driver.

- You are using ODP.NET version 19.14 (or higher), or 21.5 (or higher).

- You are using an Oracle Call Interface based driver with Oracle Client libraries version 19.14 (or higher), or 21.5 (or higher).

[Learn more](#) about TLS authentication and how to enable it.

Download client credentials (Wallet)

To download your client credentials, select the wallet type, and click **Download wallet**. You then enter a password for the wallet. This client credential download only contains information for mTLS connections. **You do not need a wallet for TLS connections.**

Wallet type

Instance wallet

[Download wallet](#)

[Rotate wallet](#)

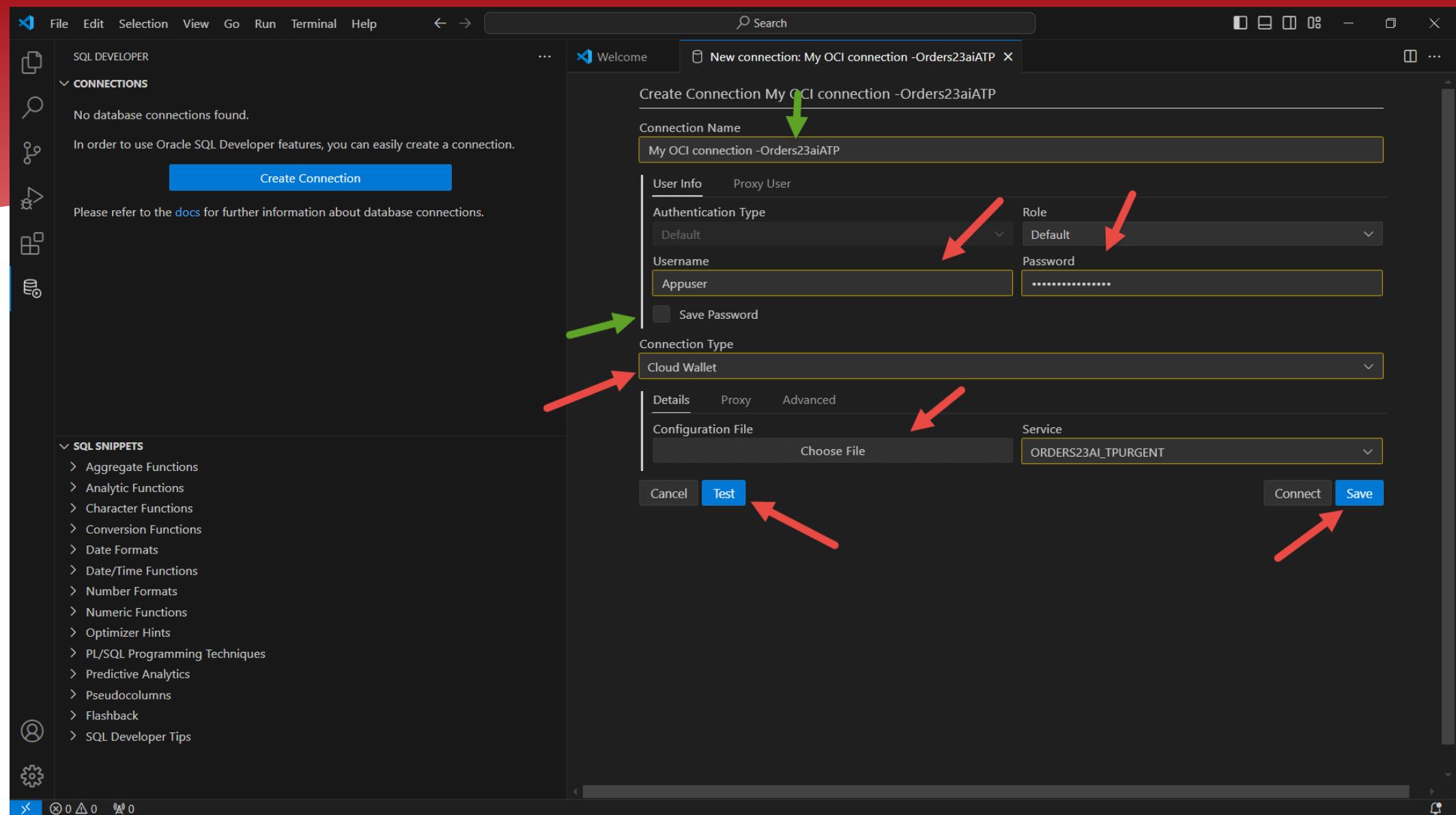
Wallet last rotated: -

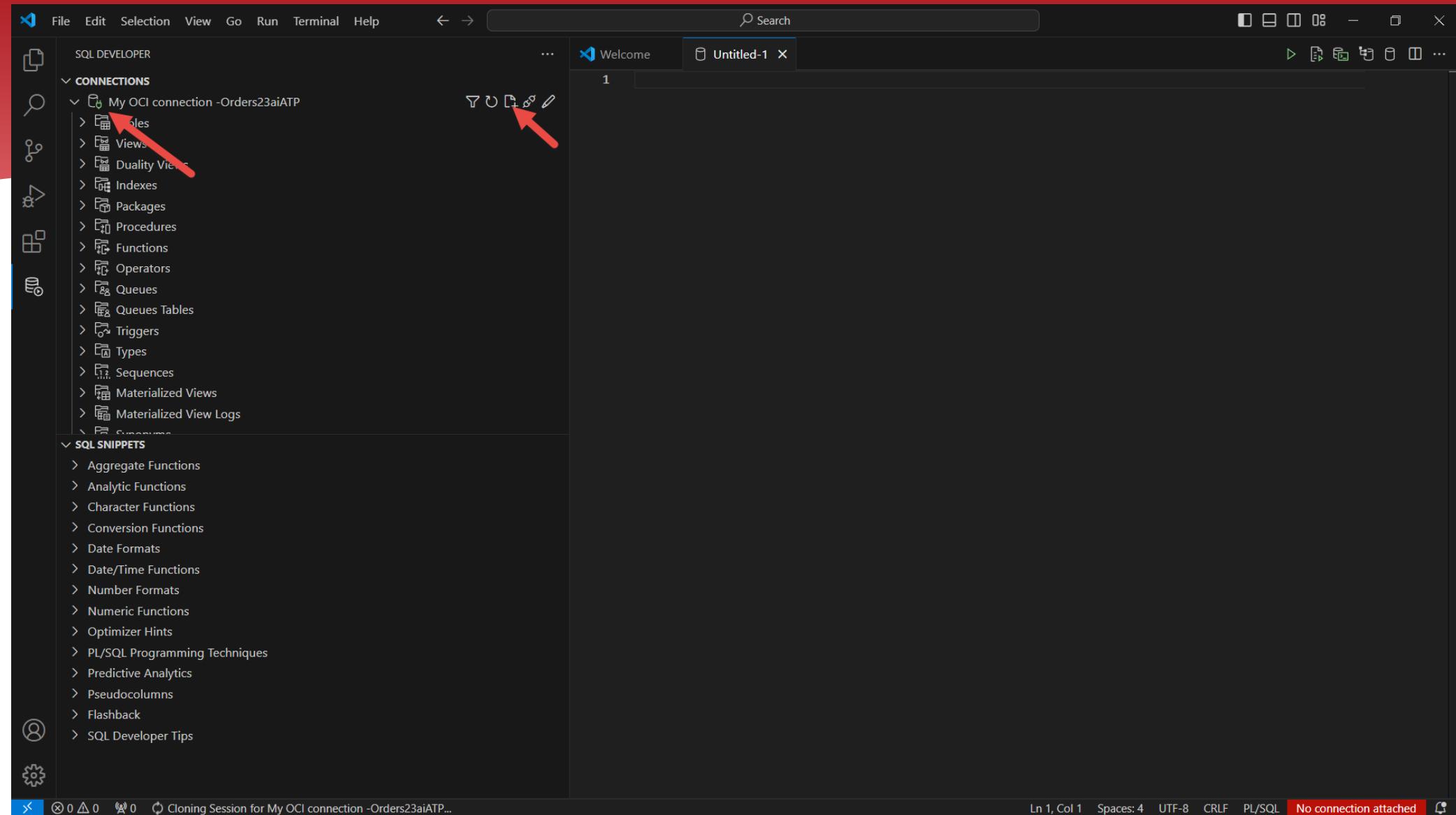
[Close](#)



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The screenshot shows the Oracle SQL Developer interface. On the left, the Connections tree view displays a single connection named "My OCI connection -Orders23aiATP". The main workspace shows a query editor with the following content:

```
Welcome
select sysdate
```

The results pane below shows the output of the query:

	SYSDATE
1	24/06/24

At the bottom right of the interface, there is a toolbar with several icons. A red arrow points to the icon for opening a new tab or window.

Bottom status bar: Ln 1, Col 15 Spaces: 4 UTF-8 CRLF PL/SQL My OCI connection -Orders23aiATP

Autonomous database

- * Provisioning
- * Backups
- * Patching and upgrades
- * Performance
- * ...

Database "words" and what do they mean

- * Tables
- * Views
- * Materialized views
- * Constraints
- * Grants
- * Synonyms: public, private
- * Indexes

Database “words” and what do they mean

- * Packages, Procedures, Functions
- * Triggers
- * Sequences
- * Partitions
- * Machine learning models
- * Statistics
- * Optimizer

Oracle Database 23ai

Oracle Database 23ai – The Next Long Term Support Release

The collage highlights various new features in Oracle Database 23ai, including:

- Data Use Case Domains
- Boolean Datatype
- Real-time SQL Plan Management
- JSON Schema
- Microservice Sagas
- Priority Transactions
- Rolling Patching
- Boolean Datatype
- JSON / Relational Duality
- JS Stored Procedures
- AI Vector Search
- Developer Role
- Shrink Tablespace
- Schema Privileges
- Readable PDB Standby
- Property Graphs
- SQL Firewall
- Globally Distributed Database
- True Cache

Oracle Database
23ai
Bring AI to your data

Copyright © 2024 Oracle and/or its affiliates | @ChrisRSaxon * blogs.oracle.com/sql * www.youtube.com/c/TheMagicofSQL

Converged database



Data Models, Data Types

- * Relational
- * Document data
 - * JSON
 - * XML
- * Graph
- * Spatial
- * Columnar
- * Vectors
- * Blockchain
- * External tables
- * ...

JSON Relational Duality

- * Stored as relational
- * Used as JSON
- * Via JSON Relational views

JSON

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3638&clear=RR,180&session=13235940564819> (Exploring JSON Relational Duality Views in Oracle Database 23ai Free using SQL)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3637&clear=RR,180&session=8778337354900> (Exploring JSON Relational Duality Views in Oracle Database 23ai Free with Java)

JSON

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3753&clear=RR,180&session=3283926786469> (Schröedinger's Document: JSON Relational Duality Views in Oracle Database 23ai)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3634&clear=RR,180&session=8778337354900> (AutoREST with JSON Relational Duality Views in Oracle Database 23ai Free)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=831> (Developing with JSON and SODA in Oracle Database)

MongoDB

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3635&clear=RR,180&session=8778337354900> (SQL, JSON, and MongoDB API: Unify worlds with Oracle Database 23ai Free)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3272&clear=RR,180&session=8778337354900> (Full Python App Development with Autonomous JSON for MongoDB Developers)

Graphs

- * A graph describes *relationships* between objects.
- * The model consists of *vertices* (also called *nodes* or *points*), and *edges* (also called *links* or *lines*) that connects vertices to each other.
- * It represents entities as vertices and relationships as edges.
- * A graph can be either undirected graphs or directed.
- * A graph model is flexible, it does not require a predefined schema, and it is easily extensible.
- * allows querying data using its relationships

Graph

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=770> (Graph Studio: Find Circular Payment Chains with Graph Queries in Autonomous Database)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3659&clear=RR,180&session=6847464786035> (Exploring Operational Property Graphs in Oracle Database 23ai Free)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=758&clear=RR,180&session=8778337354900> (Get started with Graph Studio on Oracle Autonomous Database)

Graph

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=686&clear=RR,180&session=8778337354900> (Analyze, Query and Visualize Graphs in Oracle Database)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3195&clear=RR,180&session=8778337354900> (Working with RDF Graphs in Graph Studio)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3711&clear=RR,180&session=8778337354900> (Use Graph Analytics to Recommend Movies)

Spatial

- * Geometric data is mapped on a two-dimensional flat surface
- * Geographic data is mapped around a sphere
- * Vectors are a graphical representation of the real world: points, lines, and polygons.
 - * Vector data consists of coordinates.
 - * If you connect points, you create lines; for example, a route between two houses. If you connect lines, you create a polygon; for example, a postal area.
- * Rasters are presented as a grid of pixels, for example a photo taken from a satellite.
 - * Each pixel within a raster has its value or class, for example color or a unit of a measurement.
 - * Raster data can be continuous or discrete. Raster models are especially useful for data that varies continuously.

Spatial

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=736&clear=RR,180&session=8778337354900> (Work with Spatial Data in Oracle Autonomous Database)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=800&clear=RR,180&session=8778337354900> (Introduction to Oracle Spatial Studio)
- * https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/run-workshop?p210_wid=3936&session=8778337354900 (How do I use simplified geometry and spatial index creation in Oracle Database 23ai?)

Spatial

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3683&clear=RR,180&session=8778337354900> (Pinpoint suspicious financial transactions with Oracle Spatial and Python)

Vectors

Vectors, embeddings

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3928&clear=RR,180&session=8778337354900> (AI Vector Search - Using Vector Embedding Models with Python)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3926&clear=RR,180&session=8778337354900> (AI Vector Search - Using Vector Embedding Models with Nodejs)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3925&clear=RR,180&session=8778337354900> (AI Vector Search - Using Vector Embedding Models with JDBC)

Vectors

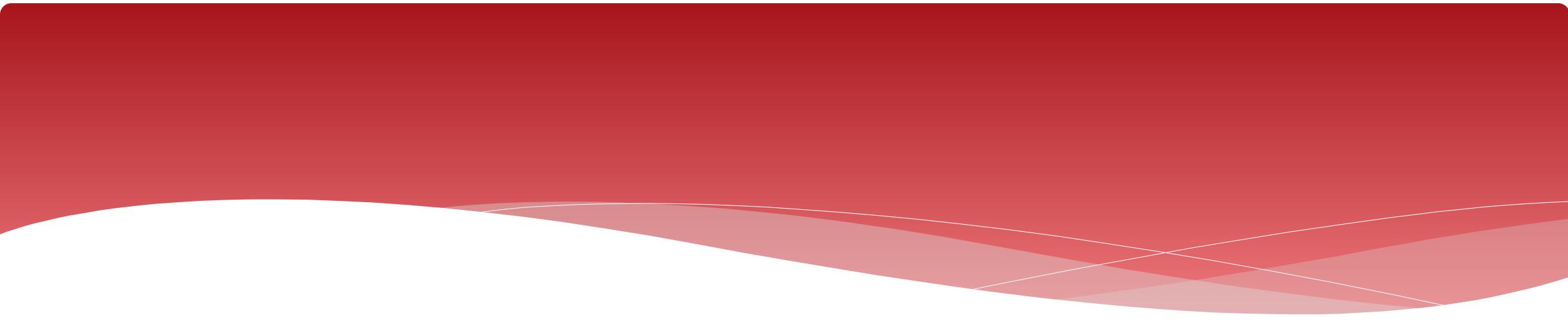
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=1070&clear=RR,180&session=8778337354900> (Oracle AI Vector Search - Basics)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3927&clear=RR,180&session=8778337354900> (AI Vector Search - 7 Easy Steps to Building a RAG Application using LangChain)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=3934&clear=RR,180&session=8778337354900> (AI Vector Search - Complete RAG Application using PL/SQL in Oracle Database 23ai)

- * REST APIs
- * JSON



Data Studio

- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=789&clear=RR,180&session=8778337354900> (Data Studio - Self-service tools for everyone using Oracle Autonomous Database)
- * <https://apexapps.oracle.com/pls/apex/r/dbpm/livelabs/view-workshop?wid=901&clear=RR,180&session=8778337354900> (Load and update Moviestream data in Oracle ADW using Data Studio)



- * LiveLabs: <https://apexapps.oracle.com/pls/apex/dbpm/r/livelabs/home>

THANK YOU!

QUESTIONS?

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