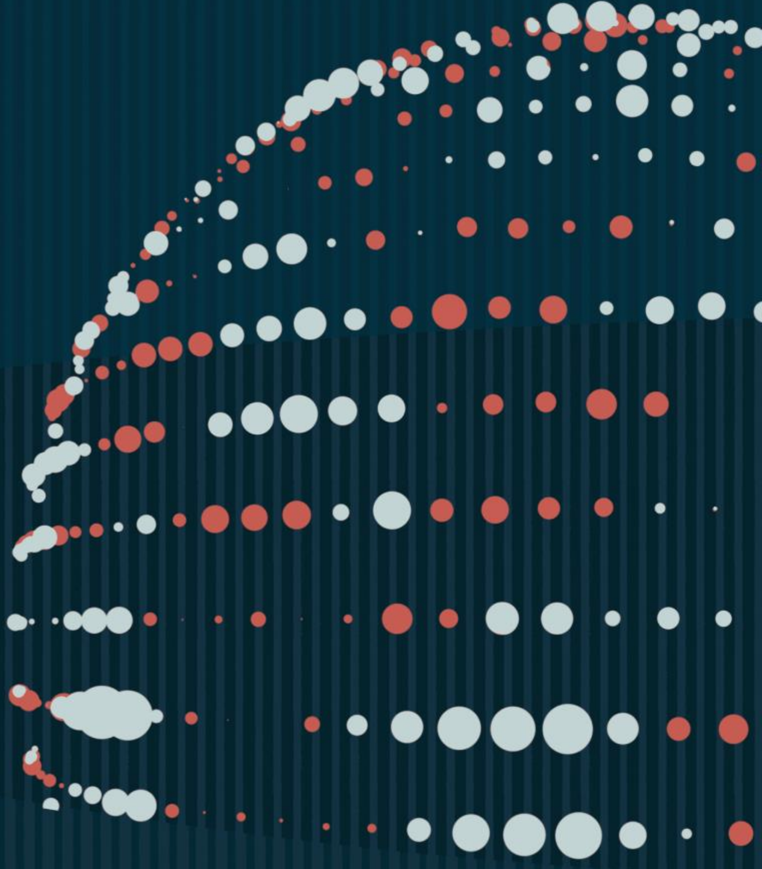
Register for the Select AI Office Hours series

Select AI Office Hours

Getting Started with Select AI



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February 7, 2025

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Agenda

- Select AI introduction
- NL2SQL
- Chat genAI use case
- RAG
- Synthetic Data Generation
- New features
- Roadmap

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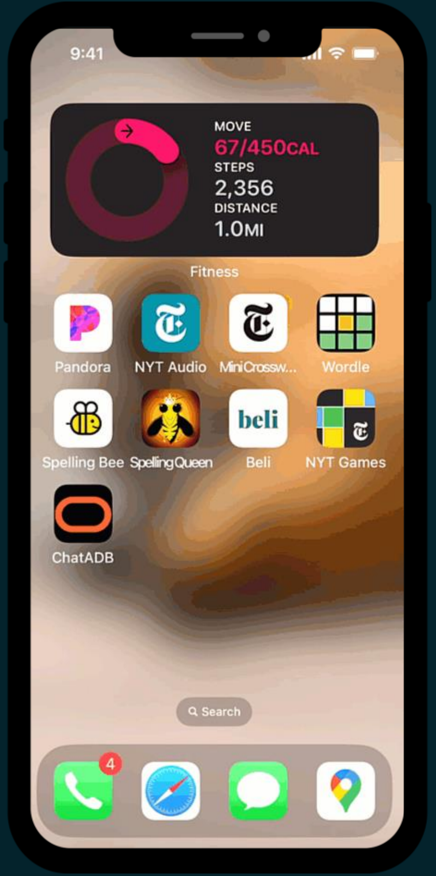
Select AI

Supporting LLM-enhanced application development and productivity through natural language



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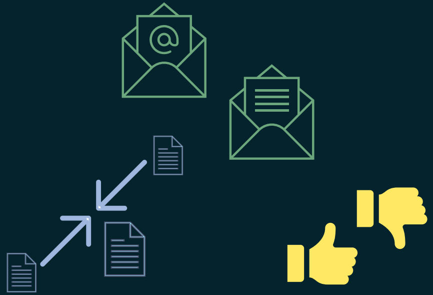
What can you do with Select AI?

A SQL interface for leveraging generative AI on Oracle Autonomous Database

Create applications using generative AI

- customer email generation
- recommendations
- sentiment analysis
- document summarization
- …and more



Generate SQL specific to your database as a developer assistant

Build apps to interact with data using natural language

Generate RAG-enhanced results using vector search

Generate synthetic data

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Large Language Models

Generate text content – “next word predictors”

Prompt → LLM →

Tasks

- Content generation
- Question answering
- Information extraction
- Sentiment analysis
- Chatbot/ conversation
- Content translation
- Document summarization
- Write email responses
- Code generation
- Discover topic/themes
- Relationship extraction
- …

- Respond to this email…
- What is generative AI?
- Summarize this article…
- What’s the sentiment of this text …

- *List my top 10 customers by revenue* ?

- *What is our internal corporate policy on <topic>* ?

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Issues with LLMs

Hallucination

A confident response that doesn't seem justified by its training data or is simply not true

Bots can embed plausible-sounding random false information in their generated content

Often happens when an LLM doesn't understand the context of the request

Bias

Can reflect or augment biases present in training data text

E.g., if the training data contains articles on physicians, and the text mentions only doctors of a single gender, the LLM's responses will reflect this

Limitations

Can only know information available up to the training date of the LLM

General knowledge – not about your business/enterprise

Not "aware" of you as an individual or your personal data

Tokens limits on input prompt and output can impact session "memory" when generating responses

Select AI can help address such issues …

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ChatDB Demonstration

Using an APEX-based chatbot for NL2SQL

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Use natural language to query data and get responses using generative AI

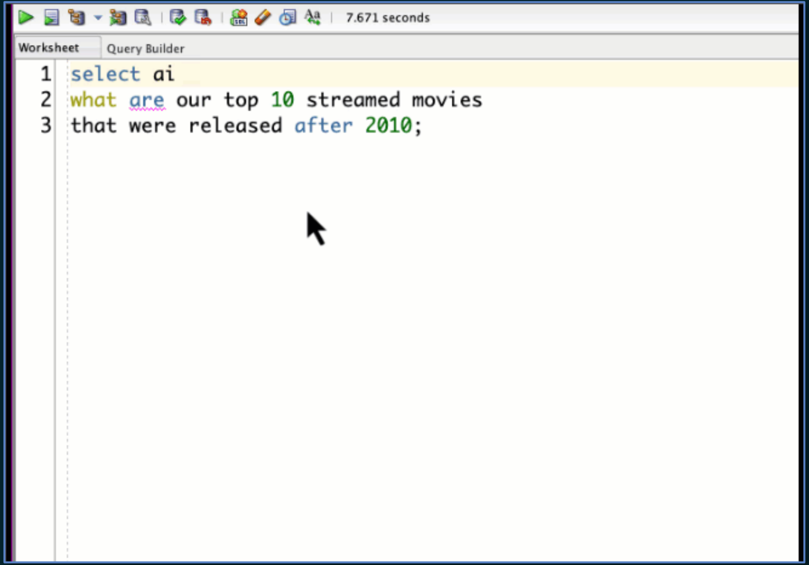
Easily access LLMs from multiple providers

- OCI GenAI Service
- OpenAI
- Azure OpenAI Service
- Cohere
- Google
- Anthropic
- Hugging Face

…more coming

Actions

- **`runsql`** - return the SQL result set (default)
- **`showsql`** – return the generated query
- **`explainsql`** – explain generated SQL query
- **`showprompt`** – display the generated prompt
- **`narrate`** – return a conversational result
- **`chat`** - general AI chat – passthrough to LLM



```
select ai
what are our top 10 streamed movies
that were released after 2010;
```

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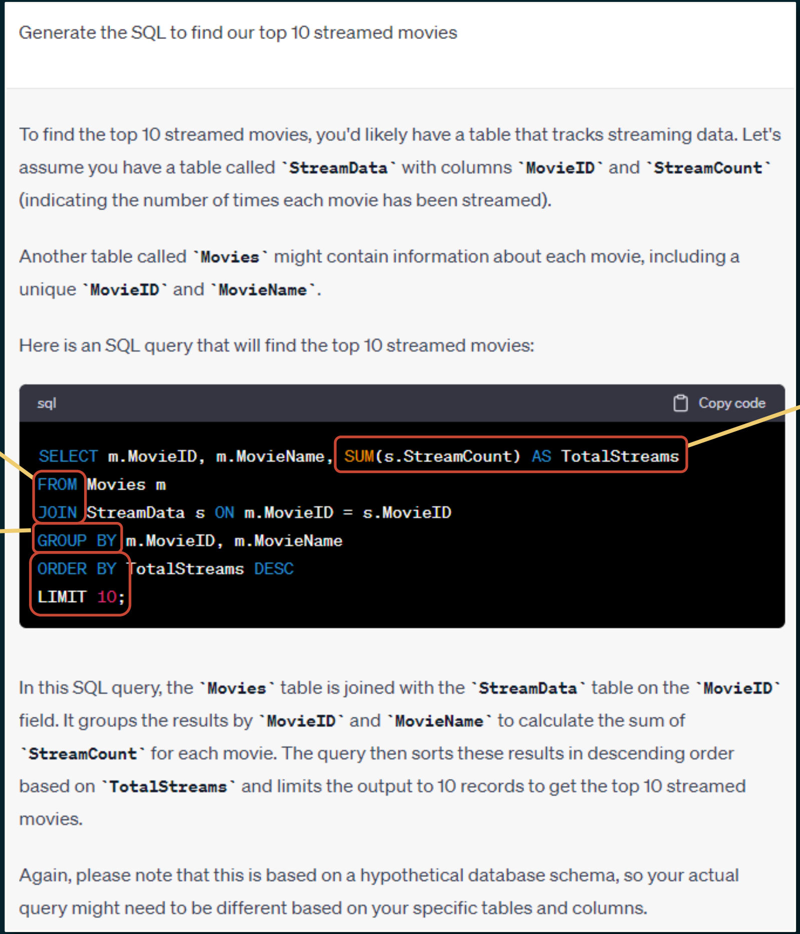
SQL generation

ChatGPT Example



Generate the SQL to find our top 10 streamed movies

To find the top 10 streamed movies, you'd likely have a table that tracks streaming data. Let's assume you have a table called `StreamData` with columns `MovieID` and `StreamCount` (indicating the number of times each movie has been streamed).

Another table called `Movies` might contain information about each movie, including a unique `MovieID` and `MovieName`.

Here is an SQL query that will find the top 10 streamed movies:

```sql
SELECT m.MovieID, m.MovieName, SUM(s.StreamCount) AS TotalStreams
FROM Movies m
JOIN StreamData s ON m.MovieID = s.MovieID
GROUP BY m.MovieID, m.MovieName
ORDER BY TotalStreams DESC
LIMIT 10;
```

In this SQL query, the `Movies` table is joined with the `StreamData` table on the `MovieID` field. It groups the results by `MovieID` and `MovieName` to calculate the sum of `StreamCount` for each movie. The query then sorts these results in descending order based on `TotalStreams` and limits the output to 10 records to get the top 10 streamed movies.

Again, please note that this is based on a hypothetical database schema, so your actual query might need to be different based on your specific tables and columns.

Joins invented “Movies” and “StreamData” tables

Aggregates, including movie name

Orders result and selects top 10

Uses “sum” for total streams

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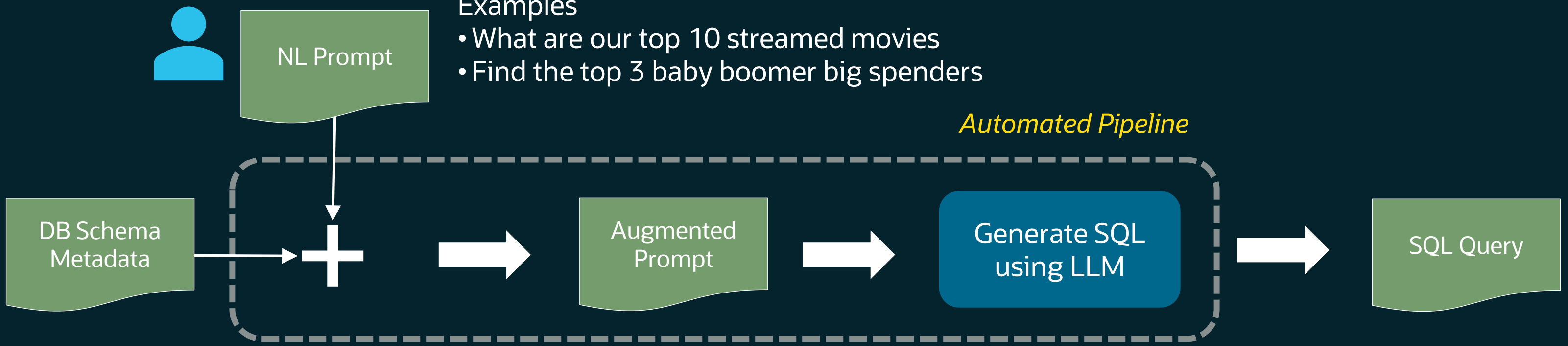
SQL query generation pipeline with ‘showsql’ action



Examples
- What are our top 10 streamed movies
- Find the top 3 baby boomer big spenders

Metadata sent to LLM
- Table names
- Column names and data types
- Comments on tables and columns

```
SQL> SELECT AI SHOWSQL what are our top 10 streamed movies
```

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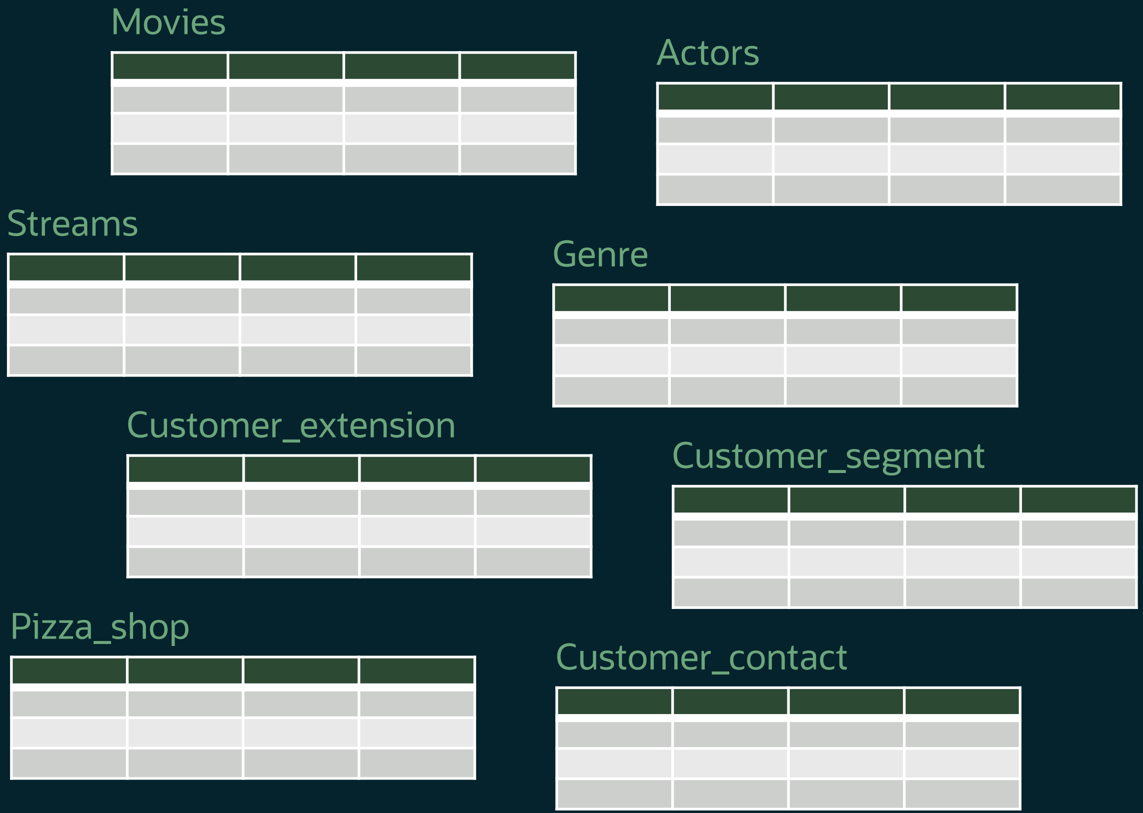
Query data in your database using natural language

An example for movie streaming service



Movies

Actors

Streams

Genre

Customer_extension

Customer_segment

Pizza_shop

Customer_contact

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AI Profile

Configure how you want to Select AI to behave for SQL generation

Choose your AI provider

Choose your LLM

Work with your full schema or specific tables and views

Create profile →

- Profile name
- AI provider
- Credential
- Object list

Set profile →

```
BEGIN
  DMBS_CLOUD_AI.create_profile(
    profile_name => 'openai_gpt4',
    attributes   =>
     '{"provider": "openai",
       "credential_name": "OPENAI_CRED",
       "model": "gpt-4o",
       "object_list": [{"owner": "MOVIESTREAM", "name": "movies"},
                       {"owner": "MOVIESTREAM", "name": "streams"},
                       {"owner": "MOVIESTREAM", "name": "actors"},
                       {"owner": "MOVIESTREAM", "name": "genre"},
                       {"owner": "MOVIESTREAM", "name": "customer_segment"}]}'
    );

  dbms_cloud_ai.set_profile(profile_name => 'openai_gpt4’);
END;
```

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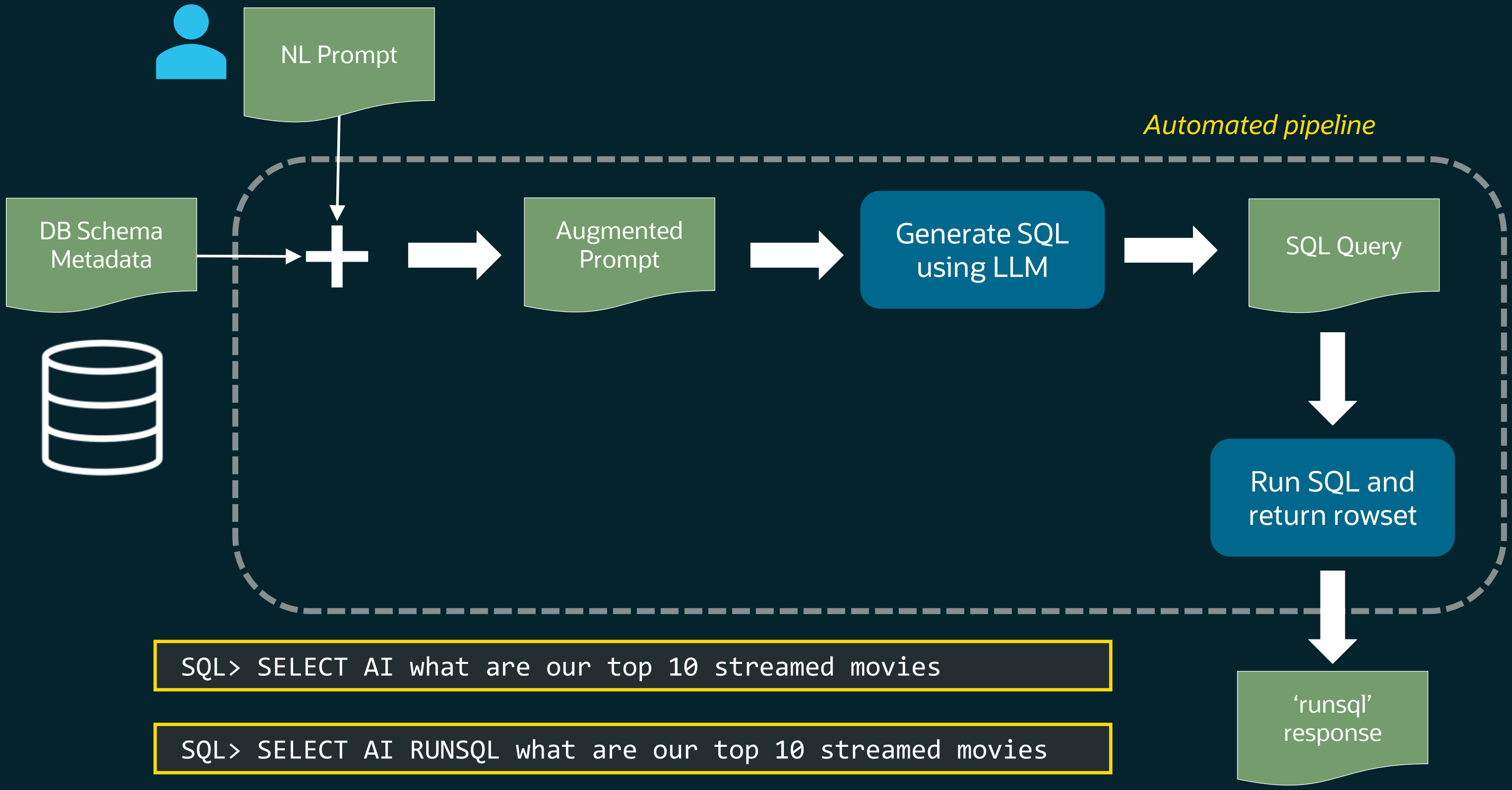
SQL query generation pipeline with ‘runsql’ action



```
SQL> SELECT AI what are our top 10 streamed movies
```

```
SQL> SELECT AI RUNSQL what are our top 10 streamed movies
```

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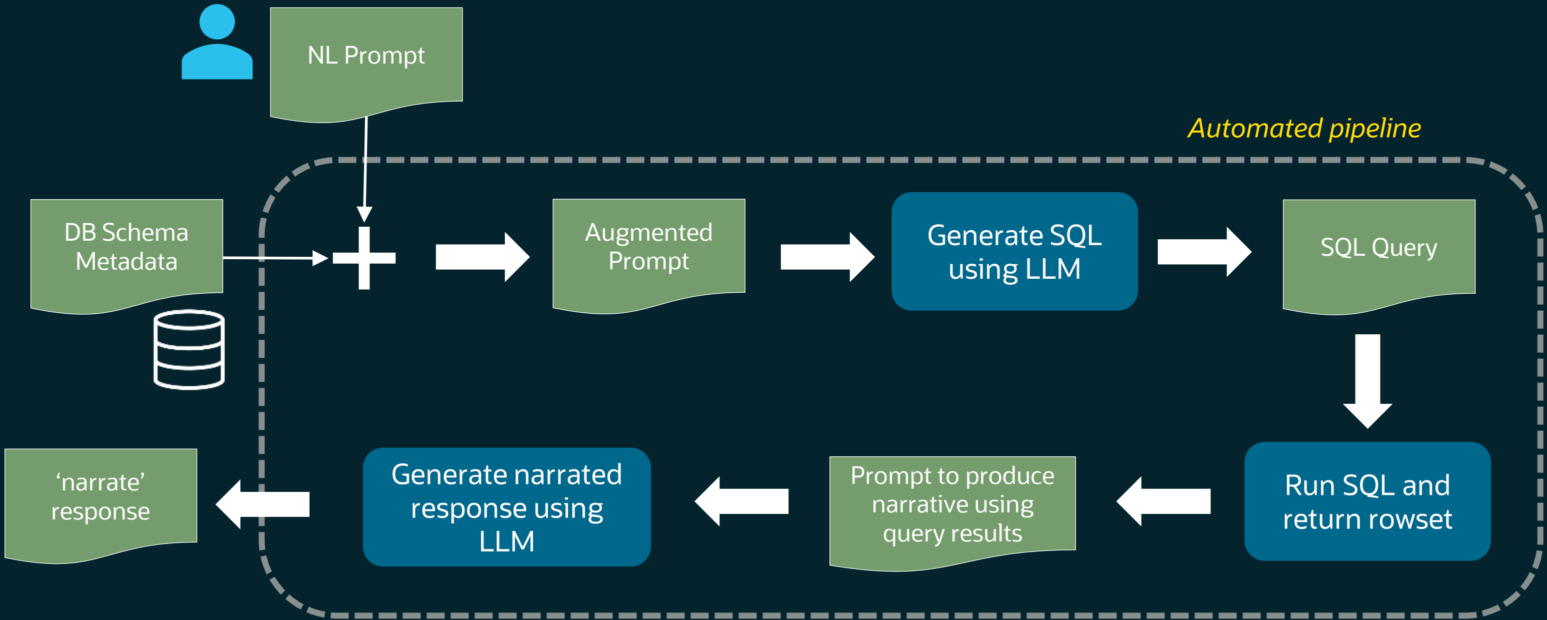
SQL query generation pipeline with ‘narrate’ action



```
SQL> SELECT AI NARRATE what are our top 10 streamed movies
```

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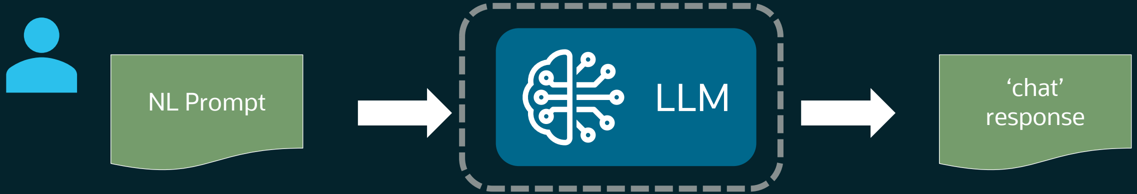
Select AI pipeline with ‘chat’ action



```
SQL> SELECT AI CHAT what is Oracle Autonomous Database
```

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Select AI Demonstration

Getting started and using NL2SQL

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Better SQL generation through better metadata

Metadata is key – a pathological case

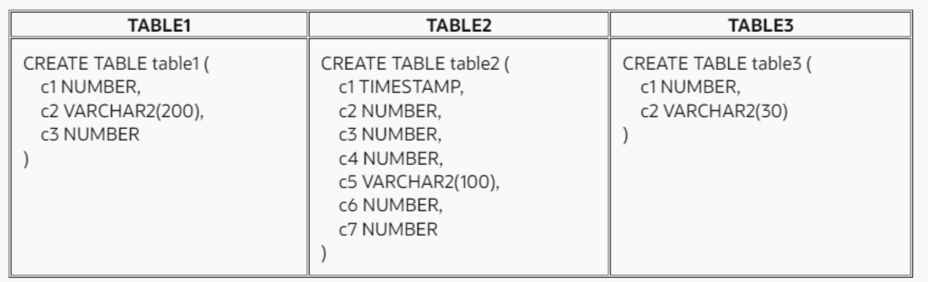

TABLE1

```
CREATE TABLE table1 (
   c1 NUMBER,
   c2 VARCHAR2(200),
   c3 NUMBER
)
```

TABLE2

```
CREATE TABLE table2 (
   c1 TIMESTAMP,
   c2 NUMBER,
   c3 NUMBER,
   c4 NUMBER,
   c5 VARCHAR2(100),
   c6 NUMBER,
   c7 NUMBER
)
```

TABLE3

```
CREATE TABLE table3 (
   c1 NUMBER,
   c2 VARCHAR2(30)
)
```

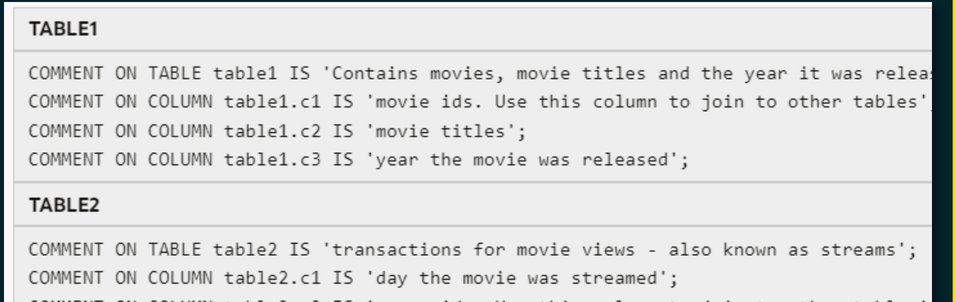

TABLE1

```
COMMENT ON TABLE table1 IS 'Contains movies, movie titles and the year it was relea
COMMENT ON COLUMN table1.c1 IS 'movie ids. Use this column to join to other tables'
COMMENT ON COLUMN table1.c2 IS 'movie titles';
COMMENT ON COLUMN table1.c3 IS 'year the movie was released';
```

TABLE2

```
COMMENT ON TABLE table2 IS 'transactions for movie views - also known as streams';
COMMENT ON COLUMN table2.c1 IS 'day the movie was streamed';
COMMENT ON COLUMN table2.c2 IS 'genre ids. Use this column to join to other tables'
```

```
begin
  dbms_cloud_ai.create_profile(
    profile_name => 'myprofile',
    attributes =>
     '{"provider": "azure",
       "azure_resource_name": "my_resource",
       "azure_deployment_name": "my_deployment",
       "credential_name": "my_credential",
       "comments":"true
       "object_list": [
   {"owner": "SELECT_AI_USER", "name": "table1"},
   {"owner": "SELECT_AI_USER", "name": "table2"},
   {"owner": "SELECT_AI_USER", "name": "table3"}
       ]}’);
end;
```

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Select AI supports conversations for chatbot-like behavior

Enable conversational LLM interaction

Select AI remembers your last 10 prompts and adds them to current prompt

Keep the conversation going with ‘chat’

- → Start your chat
- → Ask follow-up questions

Refine your data exploration with ‘runsql’, ‘showsql’, ‘narrate’, ‘explainsql’

- → Ask a question
- → Review the response
- → Follow up with more questions to refine, clarify, or get more info

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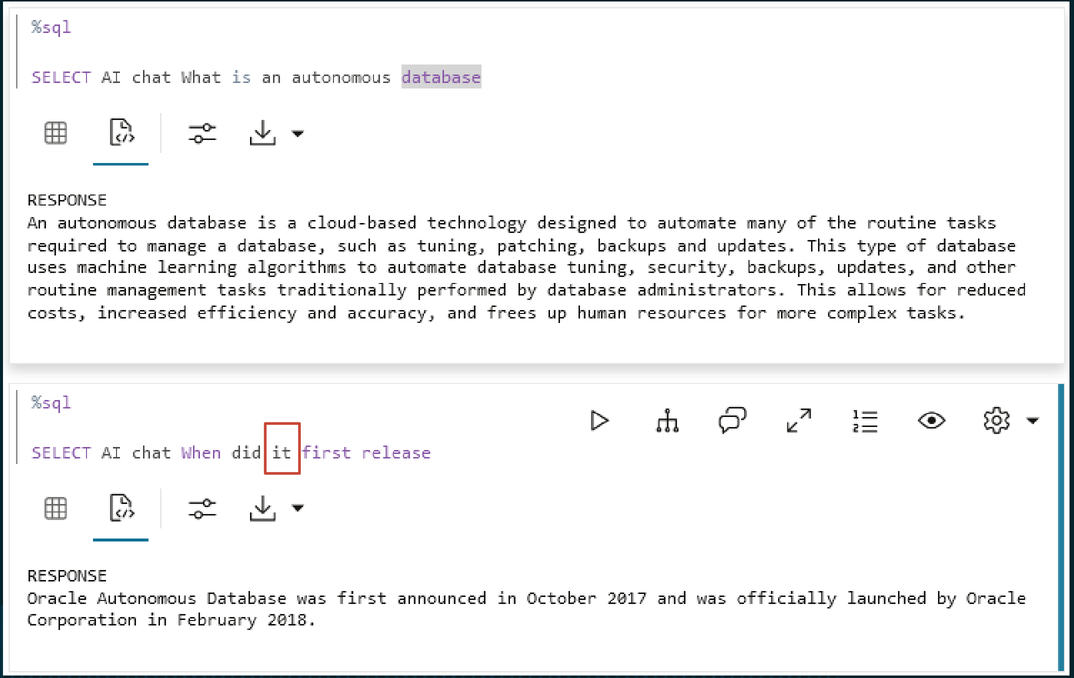
Conversations using 'chat'

Enable conversational LLM interaction

```
BEGIN
  DBMS_CLOUD_AI.CREATE_PROFILE (
    profile_name => 'OPENAI2',
    attributes =>
      '{"provider": "openai",
        "credential_name": "OPENAI_CRED",
        "model": "gpt-4",
        "conversation": "true"}');
END;
```



```
%sql

SELECT AI chat What is an autonomous database
```

```
RESPONSE
An autonomous database is a cloud-based technology designed to automate many of the routine tasks
required to manage a database, such as tuning, patching, backups and updates. This type of database
uses machine learning algorithms to automate database tuning, security, backups, updates, and other
routine management tasks traditionally performed by database administrators. This allows for reduced
costs, increased efficiency and accuracy, and frees up human resources for more complex tasks.
```

```
%sql

SELECT AI chat When did it first release
```

```
RESPONSE
Oracle Autonomous Database was first announced in October 2017 and was officially launched by Oracle
Corporation in February 2018.
```

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Conversations for data

Enable conversational LLM interaction

Keep refining your question until you get the answer you need

→ Ask a question

→ review the response

→ follow up with more questions to refine, clarify, or get more info

Example

- What are our total streams?
- Break that out by genre
- Add customer segment
- Keep the top 5 customer segments and genres by total views

```
BEGIN
  DBMS_CLOUD_AI.CREATE_PROFILE (
    profile_name => 'your_profile',
    attributes =>
        '{"provider": "azure",
          "azure_resource_name": "your-resource",
          "azure_deployment_name": "your-deployment",
          "credential_name": "AI_CREDENTIAL",
          "comments":"true",
          "conversation": "true",
          "object_list": [
            {"owner": "moviestream", "name": "GENRE"},
            {"owner": "moviestream", "name": "CUSTOMER"},
            {"owner": "moviestream", "name": "PIZZA_SHOP"},
            {"owner": "moviestream", "name": "STREAMS"},
            {"owner": "moviestream", "name": "MOVIES"},
            {"owner": "moviestream", "name": "ACTORS"}
          ]
          }'
    );
END;
```

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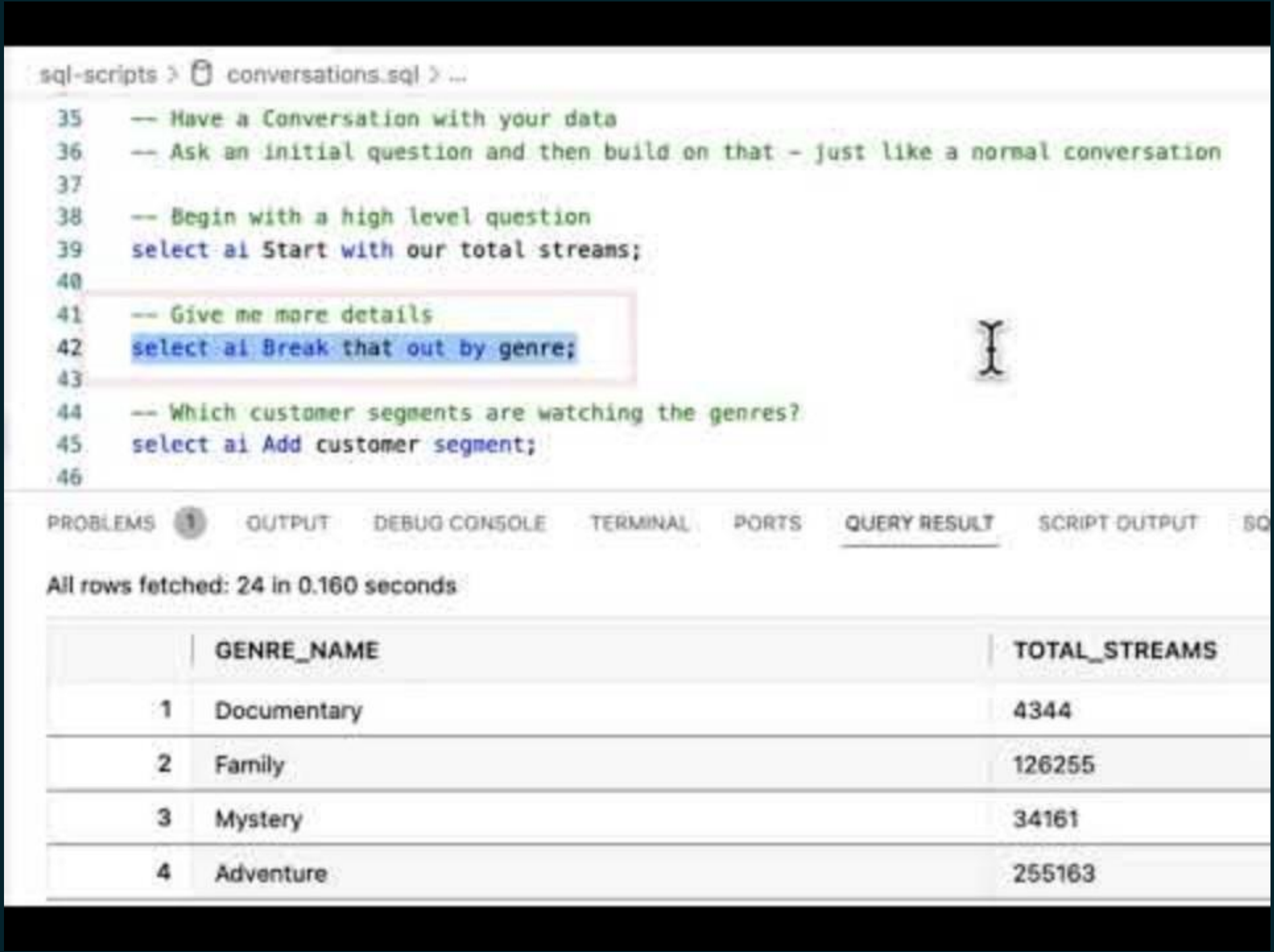
Enable chatbot-like conversations



```
-- Have a Conversation with your data
-- Ask an initial question and then build on that - just like a normal conversation

-- Begin with a high level question
select ai Start with our total streams;

-- Give me more details
select ai Break that out by genre;

-- Which customer segments are watching the genres?
select ai Add customer segment;

```

All rows fetched: 24 in 0.160 seconds

	GENRE_NAME	TOTAL_STREAMS
1	Documentary	4344
2	Family	126255
3	Mystery	34161
4	Adventure	255163

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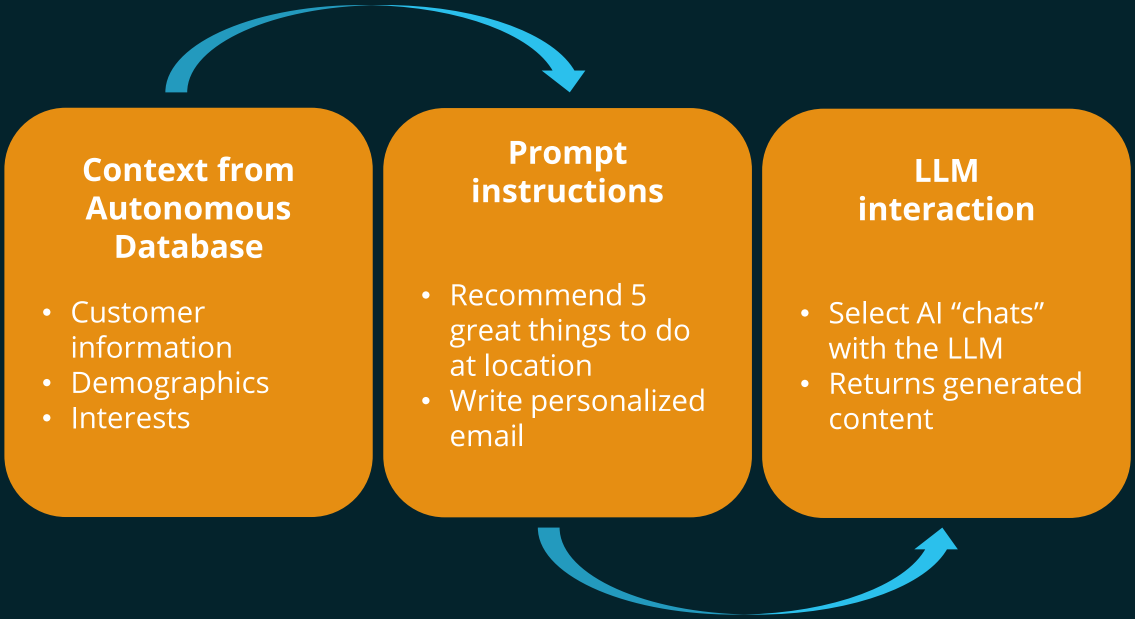
Enhance GenAI with context from your database

Generate an email to a customer with activity recommendations for a customer-specific destination



Context from Autonomous Database

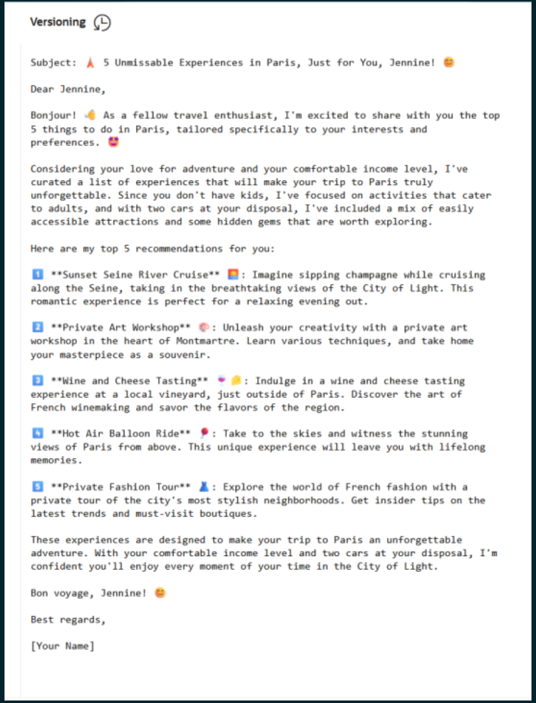
- Customer information
- Demographics
- Interests

Prompt instructions

- Recommend 5 great things to do at location
- Write personalized email

LLM interaction

- Select AI "chats" with the LLM
- Returns generated content



```
Subject: 🗼 5 Unmissable Experiences in Paris, Just for You, Jennine! 😊

Dear Jennine,

Bonjour! 👋 As a fellow travel enthusiast, I'm excited to share with you the top
5 things to do in Paris, tailored specifically to your interests and
preferences. 😍

Considering your love for adventure and your comfortable income level, I've
curated a list of experiences that will make your trip to Paris truly
unforgettable. Since you don't have kids, I've focused on activities that cater
to adults, and with two cars at your disposal, I've included a mix of easily
accessible attractions and some hidden gems that are worth exploring.

Here are my top 5 recommendations for you:

1️⃣ **Sunset Seine River Cruise** 🌅: Imagine sipping champagne while cruising
along the Seine, taking in the breathtaking views of the City of Light. This
romantic experience is perfect for a relaxing evening out.

2️⃣ **Private Art Workshop** 🎨: Unleash your creativity with a private art
workshop in the heart of Montmartre. Learn various techniques, and take home
your masterpiece as a souvenir.

3️⃣ **Wine and Cheese Tasting** 🍷🧀: Indulge in a wine and cheese tasting
experience at a local vineyard, just outside of Paris. Discover the art of
French winemaking and savor the flavors of the region.

4️⃣ **Hot Air Balloon Ride** 🎈: Take to the skies and witness the stunning
views of Paris from above. This unique experience will leave you with lifelong
memories.

5️⃣ **Private Fashion Tour** 👗: Explore the world of French fashion with a
private tour of the city's most stylish neighborhoods. Get insider tips on the
latest trends and must-visit boutiques.

These experiences are designed to make your trip to Paris an unforgettable
adventure. With your comfortable income level and two cars at your disposal, I'm
confident you'll enjoy every moment of your time in the City of Light.

Bon voyage, Jennine! 😊

Best regards,

[Your Name]
```

Compelling, personalized promotion

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Create structured application-specific prompts for the LLM

Use a query to combine tasks and contextual data

Query task and customer data

```
SELECT task,
  task_rules,
  last_name,
  first_name,
  location,
  age,
  gender,
  has_kids,
  num_cars,
  income_level,
  dog_owner
FROM v_customer,
    genai_project_task
WHERE customer_id = 1
AND   task_id = 3
```

Tabular result

TASK	TASK_RULES	LAST_NAME	FIRST_NAME	LOCATION	AGE	...	DOG_OWNER
Pick 5 great things to do at the location	1. Encourage the customer to do these things. Really sell them as to why it would be right for them 2. Consider all the information about the customer that's provided, including family and dog situation, whether they have a car and income 3. Format the result with emojis and make it fun	Mouly	Jennine	Paris, Ile-De-France	37	...	NO

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Create structured application-specific prompts for the LLM

Use built-in JSON features to structure the LLM request

Query task and customer data

```
SELECT JSON_OBJECT(*)
FROM (SELECT task,
  task_rules,
  last_name,
  first_name,
  location,
  age,
  gender,
  has_kids,
  num_cars,
  income_level,
  dog_owner
FROM v_customer,
    genai_project_task
WHERE customer_id = 1
AND   task_id = 3)
```

JSON document

```
{
  "task": "Pick 5 great things to do at the location",
  "task_rules": "
1. Encourage the customer to do these things. Really sell them as to why
it would be right for them
2. Consider all the information about the customer that's provided,
including family and dog situation, whether they have a car and income
    3. Format the result with emojis and make it fun",
  "last_name": "Mouly",
  "first_name": "Jennine",
  "location": "Paris, Île-De-France",
  "age": 37,
  "gender": "Female",
  "has_kids": "NO",
  "num_cars": 2,
  "income_level": "F: Above 110,000",
  "dog_owner": "NO"
}
```

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Create structured application-specific prompts for the LLM

Use GENERATE to make ‘chat’ request

```
DECLARE
  v_response VARCHAR2(4000);
BEGIN
  v_response :=  DBMS_CLOUD_AI.GENERATE(prompt => 'Generate email using the JSON specification
  {"task": "Pick 5 great things to do at the location",
   "task_rules": "
      1. Encourage the customer to do these things. Really sell them as to why it would be right for them
      2. Consider all the information about the customer that''s provided, including family and dog situation,
         whether they have a car and income
      3. Format the result with emojis and make it fun",
   "last_name": "Mouly",
   "first_name": "Jennine",
   "location": "Paris, Île-De-France",
   "age": 37,
   "gender": "Female",
   "has_kids": "NO",
   "num_cars": 2,
   "income_level": "F: Above 110,000",
   "dog_owner": "NO"}’,
  profile_name => 'OCI_GENAI_PROFILE',
  action       => 'chat');
  DBMS_OUTPUT.PUT_LINE(v_response);
END;
```

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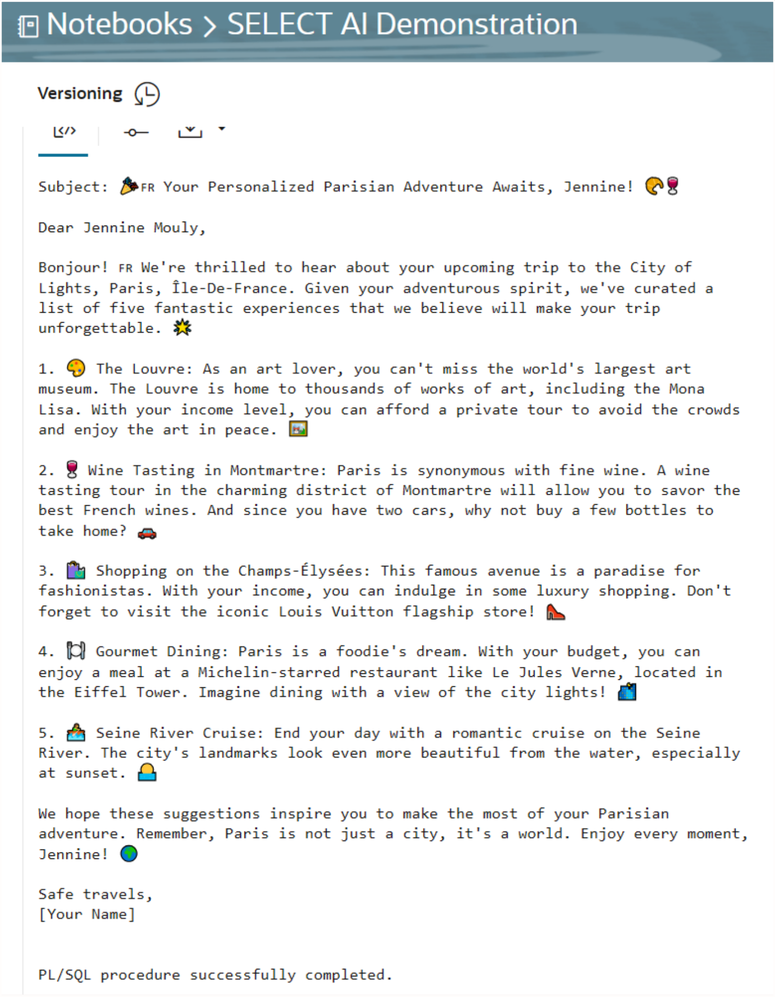
Response from LLM



```
Subject: 🎉🇫🇷 Your Personalized Parisian Adventure Awaits, Jennine! 🥐🍷

Dear Jennine Mouly,

Bonjour! 🇫🇷 We're thrilled to hear about your upcoming trip to the City of
Lights, Paris, Île-De-France. Given your adventurous spirit, we've curated a
list of five fantastic experiences that we believe will make your trip
unforgettable. 🌟

1. 🎨 The Louvre: As an art lover, you can't miss the world's largest art
museum. The Louvre is home to thousands of works of art, including the Mona
Lisa. With your income level, you can afford a private tour to avoid the crowds
and enjoy the art in peace. 🖼️

2. 🍷 Wine Tasting in Montmartre: Paris is synonymous with fine wine. A wine
tasting tour in the charming district of Montmartre will allow you to savor the
best French wines. And since you have two cars, why not buy a few bottles to
take home? 🚗

3. 🛍️ Shopping on the Champs-Élysées: This famous avenue is a paradise for
fashionistas. With your income, you can indulge in some luxury shopping. Don't
forget to visit the iconic Louis Vuitton flagship store! 👠

4. 🍽️ Gourmet Dining: Paris is a foodie's dream. With your budget, you can
enjoy a meal at a Michelin-starred restaurant like Le Jules Verne, located in
the Eiffel Tower. Imagine dining with a view of the city lights! 🌃

5. 🚣 Seine River Cruise: End your day with a romantic cruise on the Seine
River. The city's landmarks look even more beautiful from the water, especially
at sunset. 🌅

We hope these suggestions inspire you to make the most of your Parisian
adventure. Remember, Paris is not just a city, it's a world. Enjoy every moment,
Jennine! 🌍

Safe travels,
[Your Name]


PL/SQL procedure successfully completed.
```

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Retrieval Augmented Generation (RAG)

Simplifies RAG workflow so any database user can use it!

- ✓ Give the LLM new knowledge without fine-tuning
- ✓ Use natural language for semantic similarity search and LLM response generation
- ✓ Seamless integration with Oracle AI Vector Search
- ✓ Automate orchestration steps with fully managed Vector Index pipeline for new data

LLM
RAG
A
7 1 4 9

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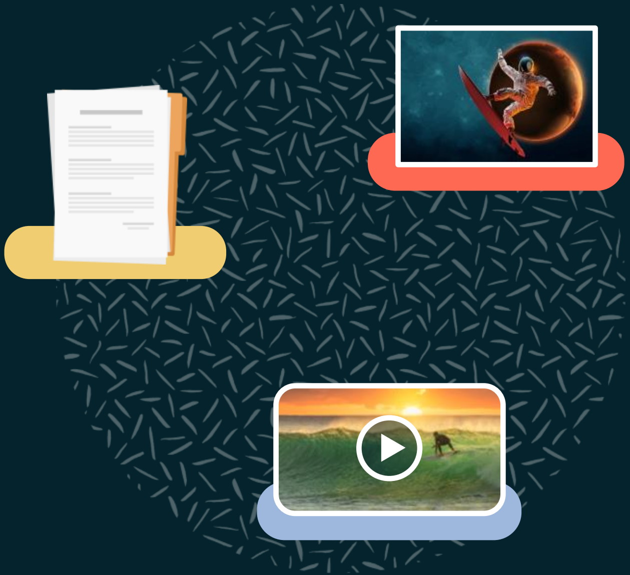

Databases are great at querying business data that is stored as strings, numbers, and dates

They have not been good at querying unstructured data such as text, images, audio, and videos

Semantic similarity search involves querying related content using vectors

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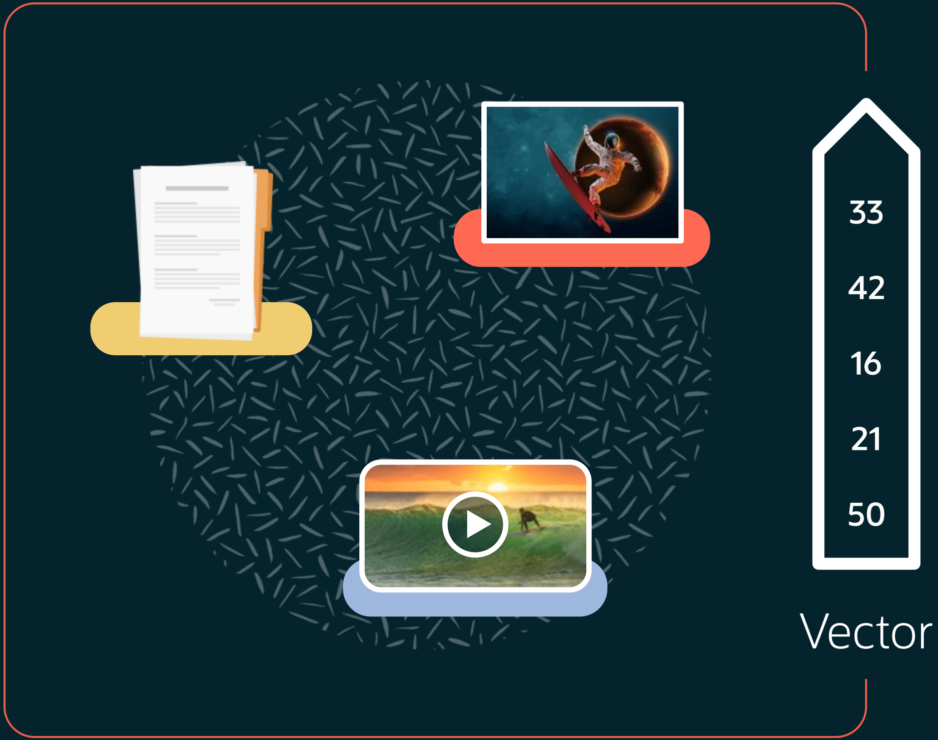

A vector is a sequence of numbers, called dimensions, that represent the semantic content of
a document, image, audio, or video

Vectors represent the semantic content of data, not the underlying words or pixels

Deep learning *transformers* (or *embedding models*) generate vectors

The terms *vector* and *embedding* are often used interchangeably

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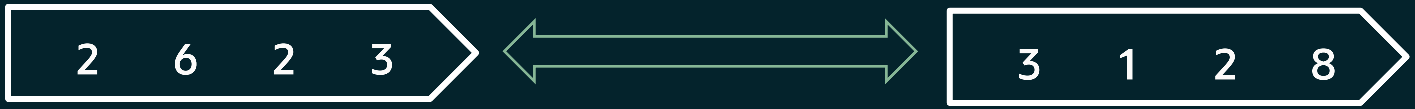
The main operation on vectors is the mathematical distance between them



Distance (Euclidean Squared)

$$= ((3-2)^2+(1-6)^2+(2-2)^2+(8-3)^2)$$

Oracle Database supports multiple mathematical distance functions

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Retrieval Augmented Generation (RAG)

A technique that uses **private database** content to **augment user-provided prompts** using semantic similarity search with LLMs

RAG enables LLMs to use business data to produce better and more accurate responses and not fine-tune LLMs using that data, which may introduce security concerns

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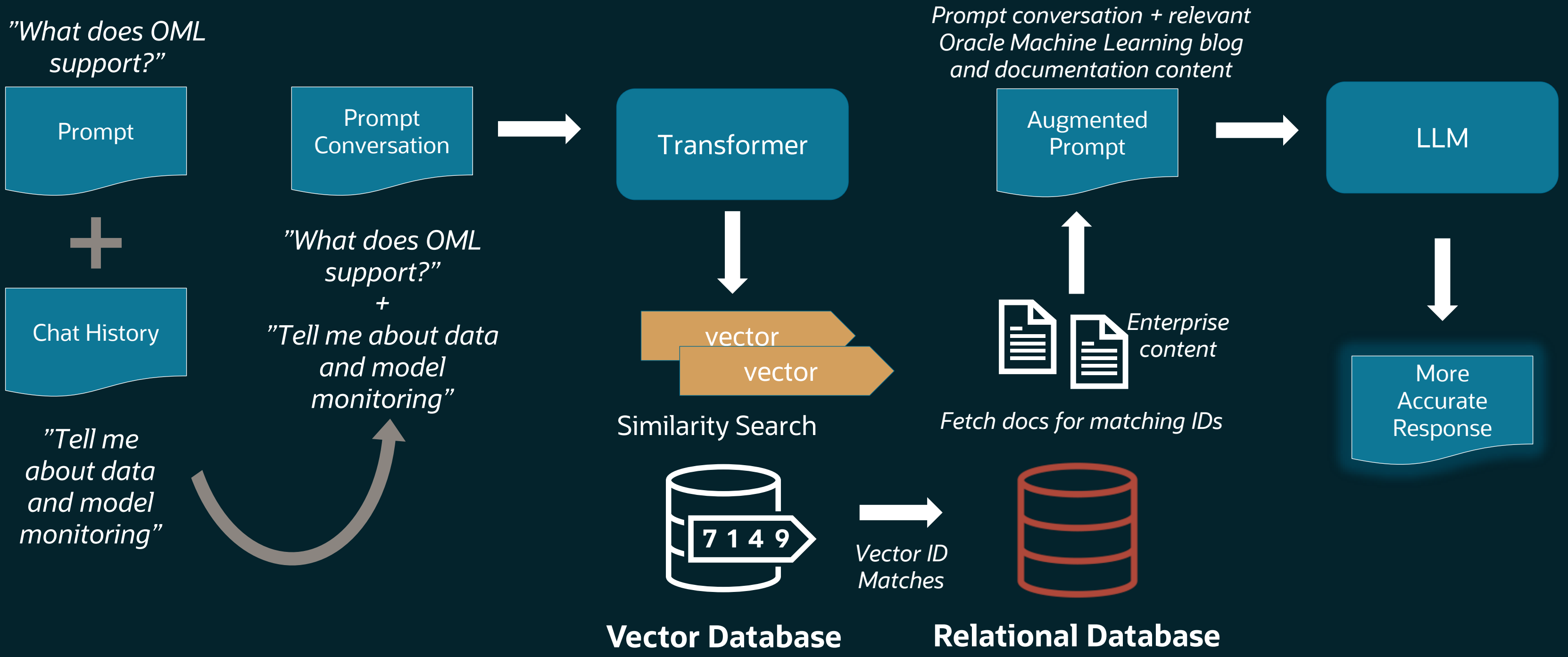
RAG pipeline example

Search Oracle Machine Learning blogs to answer question



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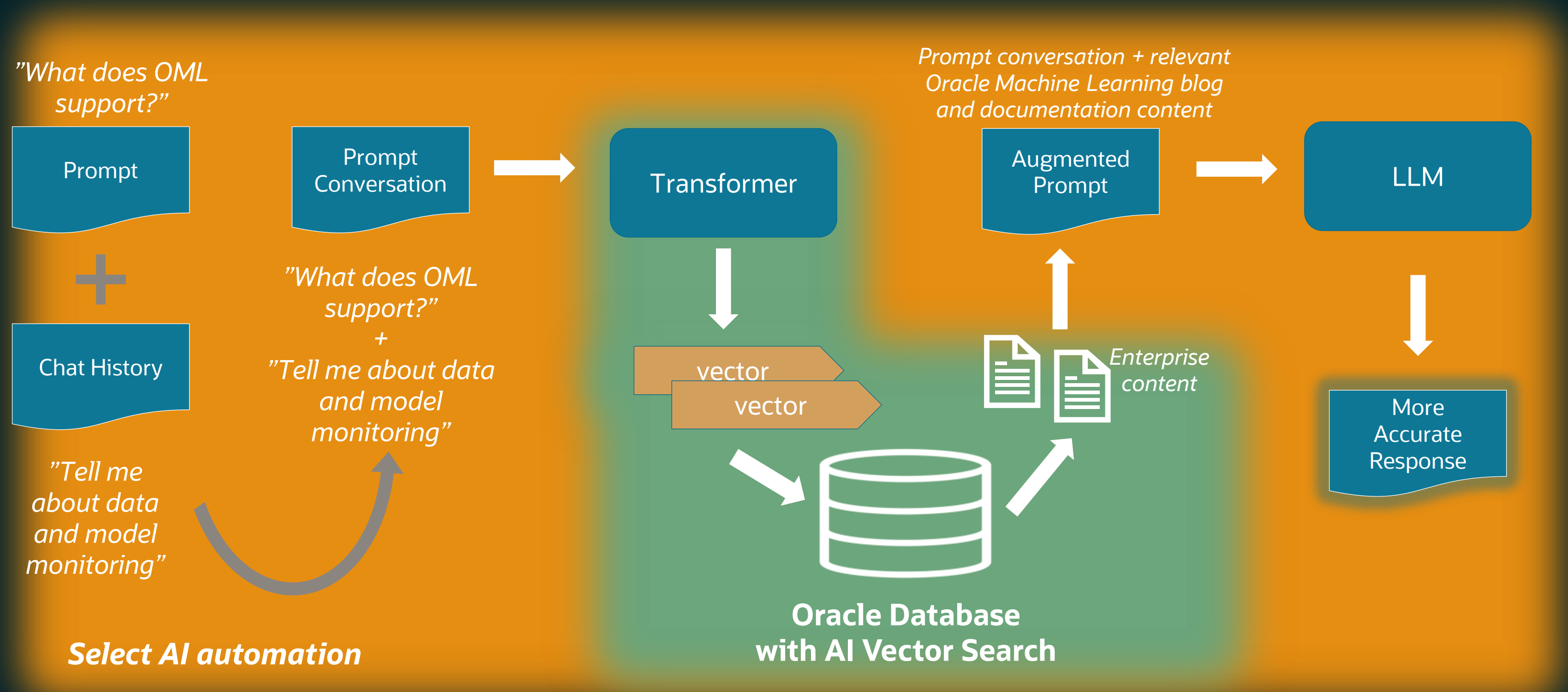
RAG pipeline example

Search Oracle Machine Learning blogs to answer question



”What does OML support?”
Prompt
+
Chat History
”Tell me about data and model monitoring”
Prompt Conversation
”What does OML support?”
+
”Tell me about data and model monitoring”
Transformer
vector
vector
Oracle Database with AI Vector Search
Enterprise content
Prompt conversation + relevant Oracle Machine Learning blog and documentation content
Augmented Prompt
LLM
More Accurate Response
Select AI automation

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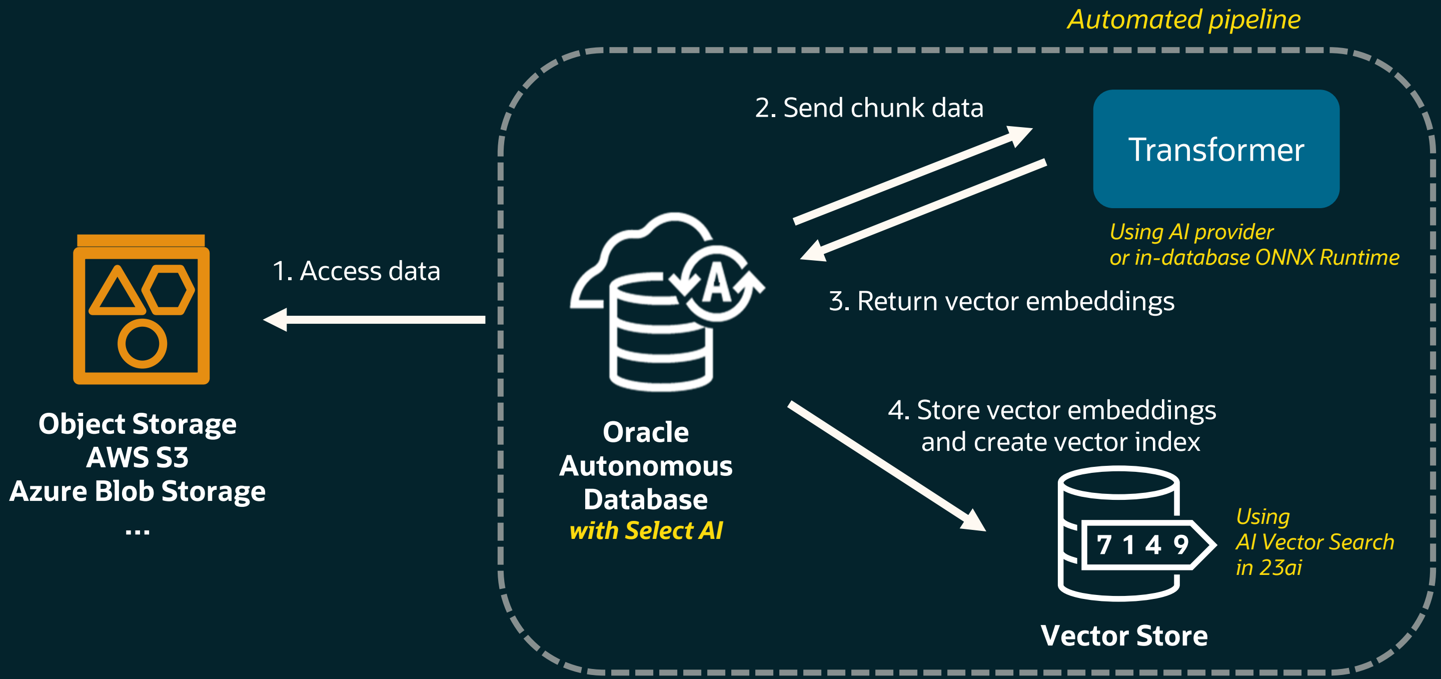
Select AI Retrieval Augmented Generation (RAG)

Step 1: Create your vector content…automated by Select AI



Automated pipeline

Object Storage
AWS S3
Azure Blob Storage
…

1. Access data

Oracle Autonomous Database
with Select AI

2. Send chunk data

Transformer

Using AI provider
or in-database ONNX Runtime

3. Return vector embeddings

4. Store vector embeddings and create vector index

Vector Store

Using
AI Vector Search
in 23ai

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Create a vector index

Example

Specify your AI provider and embedding model

```
BEGIN
  DBMS_CLOUD_AI.CREATE_PROFILE(
    profile_name => 'OPENAI_TEXT_TRANSFORMER',
    attributes   => '{"provider": "openai",
                      "credential_name": "OPENAI_CRED",
                      "embedding_model": "text-embedding-ada-002" }');
END;
```

Create the vector index

```
BEGIN
  DBMS_CLOUD_AI.CREATE_VECTOR_INDEX(
    index_name  => 'MY_VECTOR_INDEX',
    attributes  => '{"vector_db_provider": "oracle",
                     "location": "https:.../my_namespace/my_bucket/my_data_folder",
                     "object_storage_credential_name": "OCI_CRED",
                     "profile_name": "OPENAI_TEXT_TRANSFORMER",
                     "vector_dimension": 1536,
                     "vector_distance_metric": "cosine",
                     "chunk_overlap":128,
                     "chunk_size":1024}');
END;
```

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Create a RAG-enabled AI Profile for use with ‘narrate’ and ‘runsql’

Example

```
BEGIN
  DBMS_CLOUD_AI.CREATE_PROFILE(
    profile_name => 'OPENAI_GPT',
    attributes   => '{"provider": "openai",
                      "credential_name": "OPENAI_CRED",
                      "vector_index_name": "MY_VECTOR_INDEX",
                      "temperature": 0.2,
                      "max_tokens": 4096,
                      "model": "gpt-4o",
                      "embedding_model": "text-embedding-ada-002",
                      "enable_sources": true }');
END;
```

Specify vector index

Specify LLM

Specify the transformer

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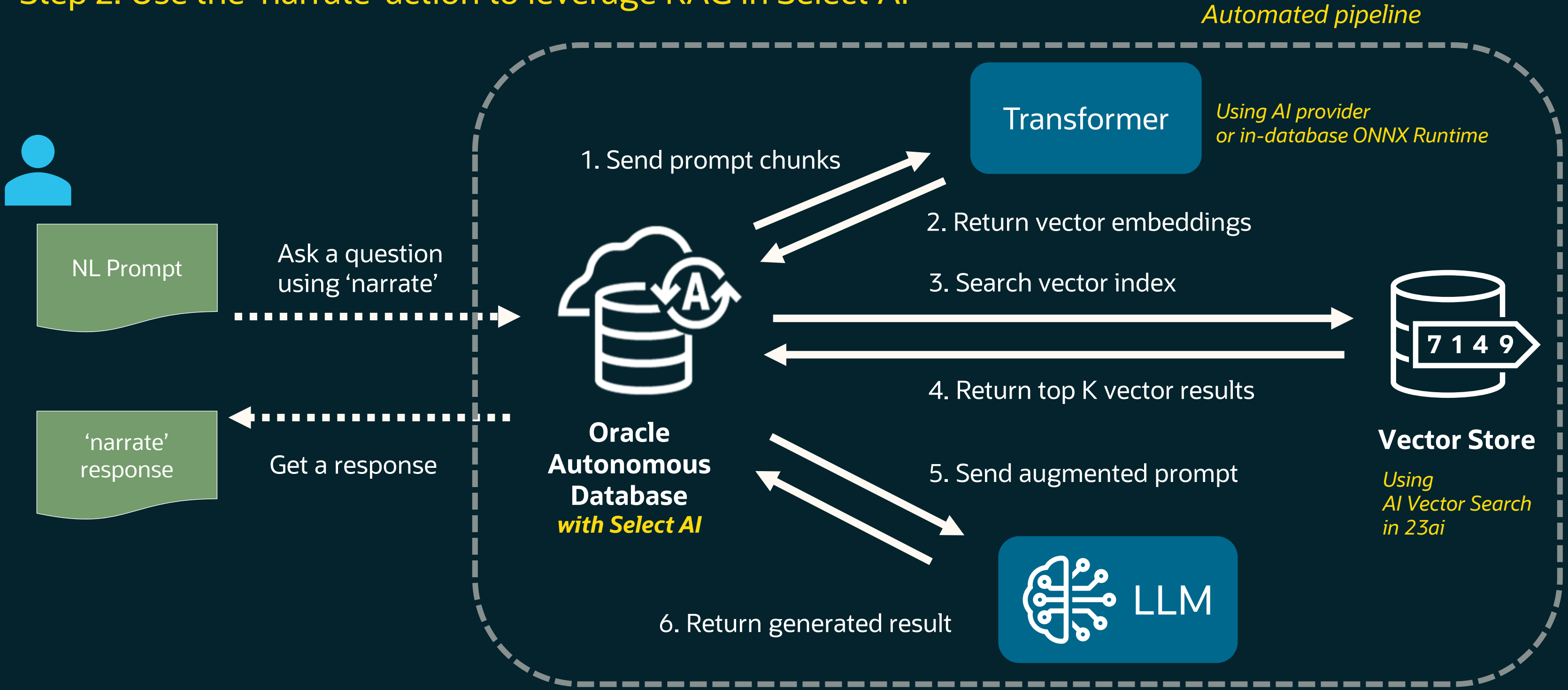
Select AI Retrieval Augmented Generation (RAG)

Step 2: Use the 'narrate' action to leverage RAG in Select AI



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Example using ‘narrate’ on Oracle Machine Learning blogs

```
EXEC DBMS_CLOUD_AI.SET_PROFILE('OPENAI_GPT’);

SELECT AI NARRATE What type of monitoring is enabled in Oracle Machine Learning

RESPONSE
Oracle Machine Learning enables two types of monitoring: Data Monitoring and Model Monitoring.

Data Monitoring is a no-code user interface that provides insight into how enterprise data evolves over time. It helps to identify
data drift and gain insight into individual data features and their interactions. This tool is essential for maintaining data
integrity for enterprise applications and dashboards.

Model Monitoring, on the other hand, helps maintain the accuracy of machine learning models and the effectiveness of applications. It
detects concept drift and quality drift, tracking and reporting changes in model prediction patterns and accuracy. This helps to know
when models need to be rebuilt or when other causes such as data drift need to be investigated.

Sources:
  - Announcing-OML-Data-Monitoring-User-Interface-on-Autonomous-Database.txt
(https://objectstorage.../select_ai_rag_demo_1/o/Announcing-OML-Data-Monitoring-User-Interface-on-Autonomous-Database.txt)
  - Announcing-OML-Monitoring-on-Autonomous-Database.txt (https://objectstorage.../select_ai_rag_demo_1/o/Announcing-OML-Monitoring-
on-Autonomous-Database.txt)
  - Simplify-your-model-monitoring-and-MLOps-with-OML-Model-Monitoring-UI.txt
(https://objectstorage.../select_ai_rag_demo_1/o/Simplify-your-model-monitoring-and-MLOps-with-OML-Model-Monitoring-UI.txt)
```

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Example using ‘runsql’

```
SELECT AI RUNSQL What type of monitoring is enabled in Oracle Machine Learning

DATA                           SOURCE               URL                                  SCORE
------------------------------ -----------------    ----------------------------------- -----
We are pleased to announce the Announcing-OML-      https://<bucket>/Announcing-OML-     0.26
availability of Oracle Machine Monitoring-on-       Monitoring-on-Autonomous-
Learning (OML) Monitoring as   Autonomous-          Database.txt
part of OML Services on Oracle Database.txt
Autonomous Database. With OML
Monitoring, you can be alerted
to issues in both data and
native in-database model
quality. In data-driven
enterprises, you need to know
if there
                                           . . .
```

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Select AI with RAG Demonstration

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Synthetic Data Generation (SDG)

Realistic test data generated by LLMs

Support multiple use cases

- Jumpstart a new project
- Validate the user experience
- Integrate with Autonomous Database Metadata Clone for test-dev scenarios

Simple and Scalable

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Example of synthetic data generation for single table

```
-- Create new or use existing table

-- Generate rows

BEGIN
  DBMS_CLOUD_AI.generate_synthetic_data(
    profile_name => 'GENAI',
    object_name  => 'Director',
    owner_name   => ‘SELECT_AI_USER',
    record_count => 5,
    user_prompt  => 'born after 1950’
  );
END;
```

```
-- Query the table to see results

SQL> SELECT * FROM SELECT_AI_USER.Director

DIRECTOR_ID NAME
----------- --------------------
          1 John Smith
          2 Emily Chen
          3 Michael Brown
          4 Sarah Taylor
          5 David Lee

-- Or ask select ai to show the results
SQL> SELECT AI how many directors are there

NUMBER_OF_DIRECTORS
-------------------
                  5
```

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Example of synthetic data generation for multiple tables

```
-- Create new/use existing tables with
-- optional referential integrity constraints

BEGIN
 DBMS_CLOUD_AI.generate_synthetic_data(
  profile_name => 'GENAI',
  object_list =>
   '[{"owner": "SELECT_AI_USER",
      "name": "Director", "record_count":5},

     {"owner": "SELECT_AI_USER",
      "name": "Movie_Actor", "record_count":5},

     {"owner": "SELECT_AI_USER",
      "name": "Actor", "record_count":10},

     {"owner": "SELECT_AI_USER",
      "name": "Movie", "record_count":5,
      "additional_prompt":
      "all movies are released in 2009"}]'
  );
END;
```

```
-- Query the table to see results

SQL> SELECT * FROM SELECT_AI_USER.Movie

MOVIE_ID TITLE                RELEASE_D GENRE   DIR_ID
-------- -------------------- --------- ------- ------
       1 The Dark Knight      15-JUL-09 Action  8
       2 Inglourious Basterds 21-AUG-09 War     3
       3 Up in the Air        04-SEP-09 Drama   6
       4 The Hangover         05-JUN-09 Comedy  1
       5 District 9           14-AUG-09 Sci fi  10


-- Or ask select ai to show the results

SQL> SELECT AI how many actors are there

Number of Actors
----------------
              10
```

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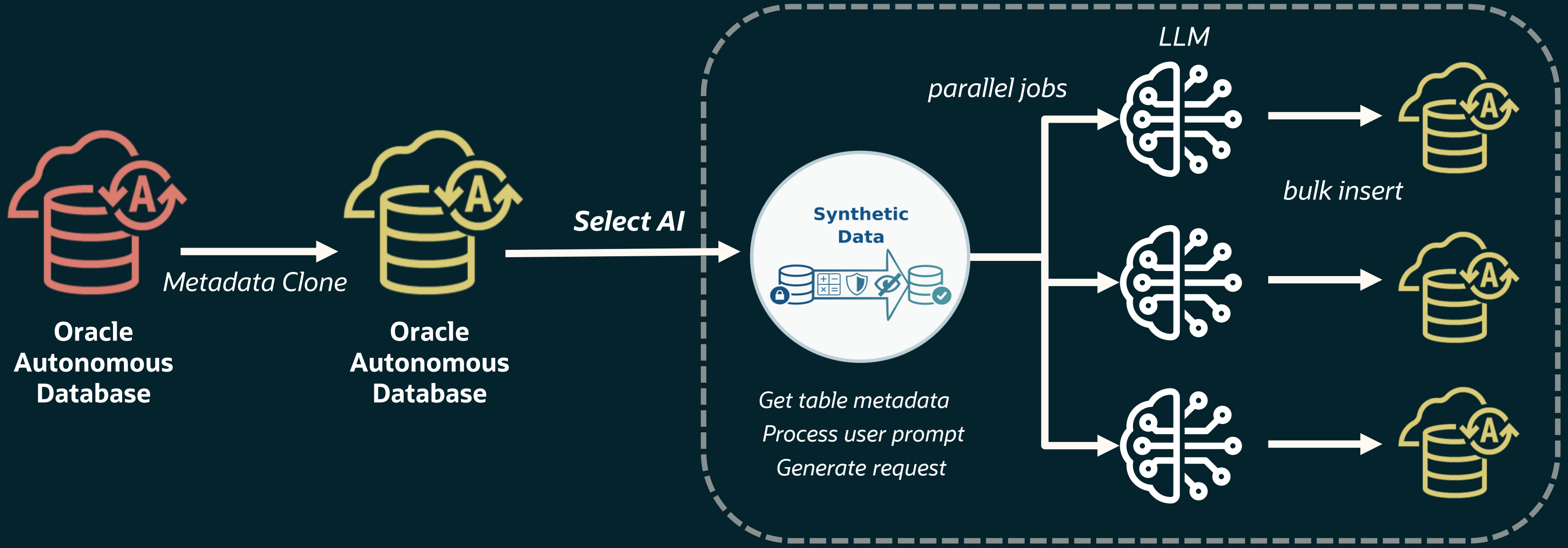
Metadata Clone + Synthetic Data



Oracle Autonomous Database

Metadata Clone

Oracle Autonomous Database

Select AI

Synthetic Data

Get table metadata
Process user prompt
Generate request

parallel jobs

LLM

bulk insert

Synthetic Data Generation Workflow

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Select AI New Features

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Recent New Features

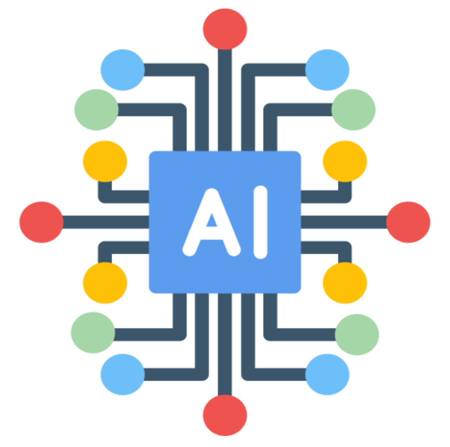
Support on-premises, non-ADB Oracle Database 23.7
(NI2SQL only)

Use ONNX-format transformers from
in-database ONNX Runtime

```
"embedding_model":"database:ALL_MINILM_L12_V2"
```

AI Providers

- Google Gemini
- Anthropic Claude
- Hugging Face, e.g. Mistral, DeepSeek, etc.



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Select AI Roadmap

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Roadmap

Support on-premises, non-ADB Oracle Database 23.8
(with RAG and SDG)

Provide a conversation management API

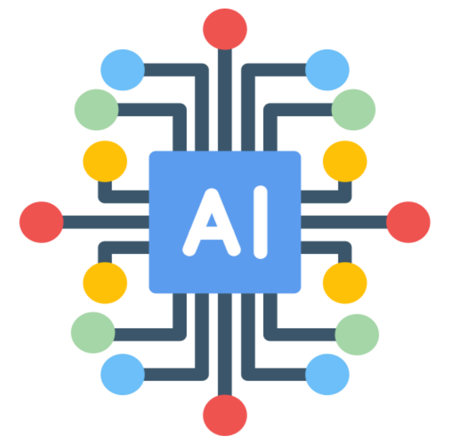
NL2SQL

RAG

AI Profile

AI Providers

Actions



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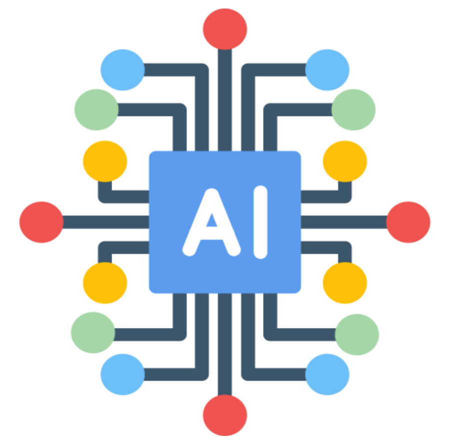
Roadmap: NL2SQL

- ✓ Support 23ai ANNOTATIONS on tables/columns in metadata
- ✓ Augment metadata with foreign key constraints
- ✓ Enable case-insensitive WHERE clause for better query responses
- ✓ Historical view of Select AI prompts and responses
- ✓ Support Analytic Views
- ✓ Handle large schema by automatically detecting object list for prompt metadata
- ✓ Collect feedback/corrections on generated SQL to improve prompt tuning



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Roadmap: Handle large schema metadata

Automates/optimizes selection of schema object (tables/views) based on user prompt

Can significantly reduce metadata volume sent to LLM

Leverages AI Vector Search with transformer defined in AI profile

Process

- Vectorize schema metadata of all schema objects
- Periodically update vector data (per settable **`refresh_rate`**) to reflect schema changes
- Based on the vector similarity, retrieve metadata for top K (default **`match_limit`** 10) most relevant objects
- Adjust **`similarity_threshold`** to determine most contextually similar objects

Enabled using AI Profile attribute **`"object_list_mode": "automated"`**

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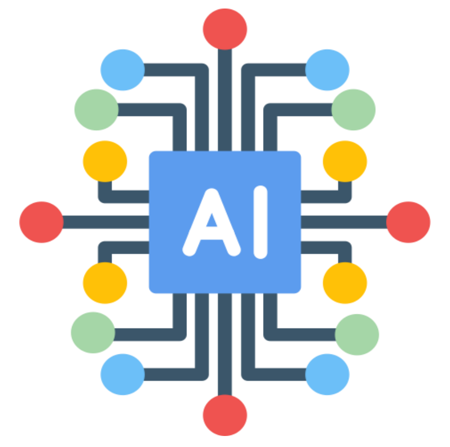
Roadmap: RAG

- ✓ Process PDF, XLS, and PPT files for vector index creation
- ✓ Include chunk offsets in RAG sources listing
- ✓ Multi-modal LLM and transformer supporting images and text
- ✓ Hybrid vector index support
- ✓ Graph RAG
- ✓ Enable vector index creation from database table columns
- ✓ Support multiple document sources in same AI profile
- ✓ Additional document sources from directory objects (DBFS or NFS), Google Drive, and MS SharePoint



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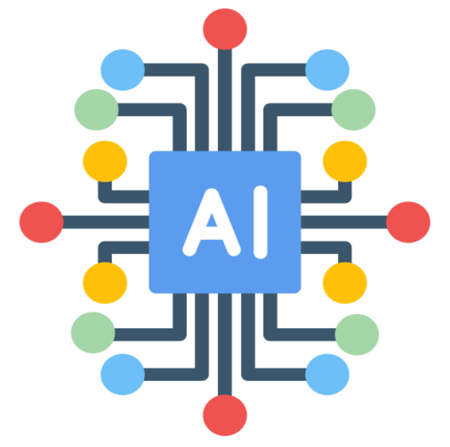
Roadmap: AI Profile

Settings to:

- ✓ Specify conversation chat history length and retention period
- ✓ Restrict tables used to those explicitly listed
- ✓ Enable using a single AI Profile for both object list for NL2SQL and vector index with RAG



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Roadmap: Conversation Management API

Supports building ChatGPT-like chatbots

Persist conversations across sessions

Provide manual or LLM-generated conversation titles

Set the conversation retention period
(# days before deletion)

Facilitates use within Oracle APEX

API

- RESET_CONVERSATION ( )
  Remove history from current conversation (start over)
- BEGIN_CONVERSATION (name)
  Start new named conversation
- DELETE_CONVERSATION (name)
  Remove named conversation
- LOAD_CONVERSATION (name)
  Load named conversation and continue using
- LIST_CONVERSATIONS ( )
  Return list of existing named conversations
- SELECT * FROM V$ view
  Return rowset of existing named conversations

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Roadmap: AI Providers

- ✓ Support privately hosted LLMs using Ollama over private endpoints

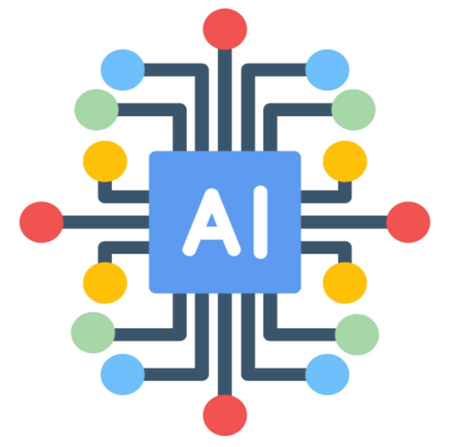
  In AI Profile

  ```
  "provider":"ollama"
  "provider_endpoint":"myhost.oraclevcn.com"
  ```

  and then…

  ```
  alter database property
  set route_outbound_connections = 'ENFORCE_PRIVATE_ENDPOINT'
  ```

- ✓ ADB-provided LLM
- ✓ AWS Bedrock and OpenAI-compatible providers



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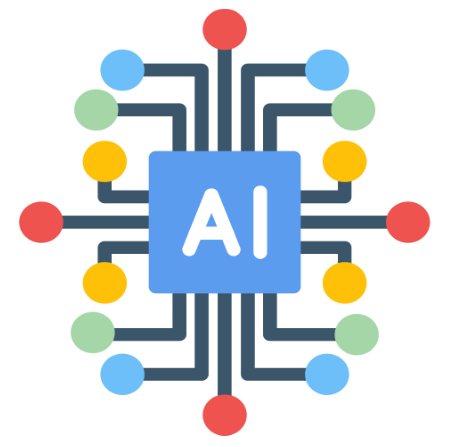
Roadmap: Actions

- ✓ ‘summarize’ – return text summarization of long-passage text
- ✓ ‘feedback’ – user feedback on NL2SQL results to improve future queries
- ✓ ‘embedding’ – return prompt embedding from transformer
- ✓ ‘showprompt’ – return augmented prompt sent to LLM
- ✓ ‘admin’ – support for database administration



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Roadmap: Prompt tuning with ‘feedback’ action

```
-- SQL Text
SQL> select ai feedback for query
"select ai showsql how many watch histories in
total", use sum instead of count

SQL> select ai feedback for query
"select ai showsql how many watch histories in
total", the sql query generated is correct

-- SQL ID
SQL> select ai feedback
use sum instead of count for sql_id  1v1z68ra6r9zf

SQL> select ai feedback
sql query result is correct for sql_id  1v1z68ra6r9zf

-- Latest SELECT AI statement invoked (default)
SQL> select ai feedback
use ascending sorting for ranking

SQL > select ai feedback
the result is correct
```

```
DBMS_CLOUD_AI.FEEDBACK(profile_name  IN VARCHAR2,
                       sql_text       IN  CLOB,
                       feedback_type IN VARCHAR2,
                       response       IN  CLOB);

DBMS_CLOUD_AI.FEEDBACK(profile_name  IN VARCHAR2,
                       sql_id         IN VARCHAR2,
                       feedback_type IN VARCHAR2,
                       response       IN  CLOB);
```

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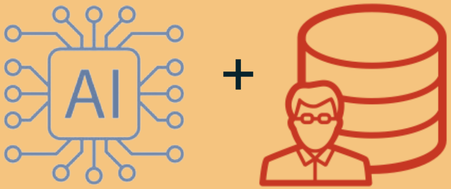
Roadmap: AI for ADMINs

- Simplify database administration using AI
  - Troubleshoot SQL performance
  - Identify Application bottlenecks
  - Monitor Database resources
- Enable via new action ‘admin’
- LLM categorizes user question
- Category determines specific prompt instructions

SELECT AI ADMIN



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Roadmap: AI for ADMINs

```
SQL> SELECT AI ADMIN find any issues with queries on employee table

RESPONSE
----------------------------------------------------------------------------------------------------
The SQL statement `select * from employee` has an issue related to the Cost-Based Optimizer (CBO)
system statistics. The observation indicates that the workload CBO statistics are not gathered, and
the CBO is using default values. This can lead to suboptimal execution plans.

To address this, you should gather system statistics using the `DBMS_STATS.GATHER_SYSTEM_STATS`
procedure. Here is an example of how you can do this:

BEGIN
   DBMS_STATS.GATHER_SYSTEM_STATS('INTERVAL’, interval => 60);
END;
/

This command gathers system statistics over a 60-minute interval. Adjust the interval as needed
based on your workload and system activity.
```

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For more information on Select AI…

Blogs

Announcing Select AI with Retrieval Augmented Generation (RAG) on Autonomous Database

Announcing Select AI for Synthetic Data Generation

Introducing Select AI Natural Language to SQL on Autonomous Database

Announcing Select AI with Azure OpenAI Service on Autonomous Database

Announcing Select AI on Autonomous Database with OCI Generative AI Service

How to help AI models generate better natural language queries

Conversations are the next generation in natural language queries

Accelerate innovation with enterprise data, OCI Generative AI, and enhanced security

Documentation
https://docs.oracle.com/en-us/iaas/autonomous-database-serverless/doc/sql-generation-ai-autonomous.html

LiveLabs
Chat with Your Data in Autonomous Database Using Generative AI
Develop apps using GenAI, Autonomous Database, and React

Videos
Simplify Developing RAG Applications
Autonomous Database Speaks "Human" using Select AI

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Register for the Select AI Office Hours series

Getting Started with Select AI

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