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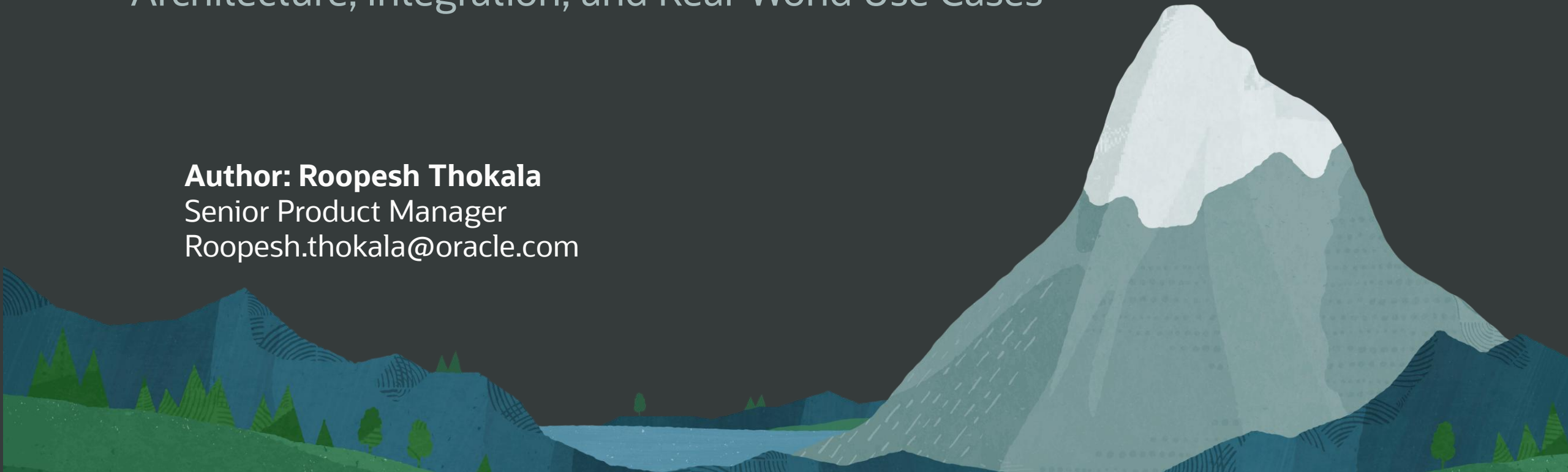
Building Intelligent Applications with RAG Chatbots in Oracle APEX

Architecture, Integration, and Real-World Use Cases

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Agenda

- RAG Chatbots
 - APEX Native Chat User Interface with RAG Sources
 - Oracle AI Vector Search – Oracle Database 23ai
 - OCI Generative AI Agents – Oracle Cloud
- Resources

Provide RAG Data for AI Calls

AI Configurations

AI Configurations centralize key Generative AI settings.

Customizable **System Prompt**,
Welcome Message, and **RAG Sources**.

Use it in both the **Show AI Assistant** and **Generate Text with AI** Dynamic Actions

APEX_AI PL/SQL API

Generative AI Configuration

CancelDeleteApply Changes

Show AllIdentificationSubscriptionGenerative AIRAG SourcesAdvancedComments

Generative AI

ServiceOCI Gen AI?

System Prompt ?

↶↷🔍APEX Assistant⚙️

1 Use the Information provided about the school to answer all questions:

2

3 If the question cannot be answered based on the information provided, say "Sorry, I can't provide an answer to that question based o

Welcome Message ?

↶↷🔍APEX Assistant⚙️

1 Welcome! What would you like to know about this high school?

RAG SourcesCreate RAG Source

Name	Description	Type	Conditional	Updated	Updated By
School Info	Information about the school	SQL Query		6 days ago	MONICA
course		SQL Query	Yes	6 days ago	MONICA
facilities		SQL Query	Yes	6 days ago	MONICA
language		SQL Query	Yes	6 days ago	MONICA

RAG Sources - Overview

RAG Source

CancelDeleteApply Changes

Show AllIdentificationDescriptionSourceAdvancedServer-Side ConditionSecurityConfigurationComments

Identification

NameProject Details RAG Source

Description

Description

Source

TypeSQL Query

SQL Query

```
1 SELECT
2   'Project Name : '
3   || PROJECT_NAME
4   || CHR(10)
5   || CHR(13)
6   || 'Milestone Title : '
7   || MILESTONE_TITLE
8   || CHR(10)
9   || CHR(13)
10  || 'Task Name : '
11  || TASK_NAME
12  || CHR(10)
13  || CHR(13)
14  || 'Task Status : '
15  || TASK_STATUS
```

Advanced

Maximum Tokens

- Use **RAG Sources** to enrich AI conversations with application-specific data.
- Can include **SQL Queries**, **Function Bodies** **Returning CLOB**, or **Static Text**.

apex.oracle.com/go/blog-ai-config-and-rag-sources

RAG Sources – Server-Side Conditions

RAG Source [Cancel] [Delete] [Apply Changes]

Identification

Name: Project Details RAG Source

Description

Description:

Source

Type: SQL Query

SQL Query

```
1 SELECT
2   'Project Name : '
3   || PROJECT_NAME
4   || CHR(10)
5   || CHR(13)
6   || 'Milestone Title : '
7   || MILESTONE_TITLE
8   || CHR(10)
9   || CHR(13)
10  || 'Task Name : '
11  || TASK_NAME
12  || CHR(10)
13  || CHR(13)
14  || 'Task Status : '
15  || TASK_STATUS
```

Advanced

Maximum Tokens:

- Use **Authorization Schemes** or **Server-side Conditions** to control which RAG data is included
- Use **Server-side Condition** offers even more flexibility: **Any User Prompt Contains** and **Last User Prompt Contains**.
- Use **APEX\$AI_ALL_USER_PROMPTS** and **APEX\$AI_LAST_USER_PROMPT** bind variables for custom RAG logic

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Show AI Assistant Dynamic Action - Overview

A **Native Dynamic Action** in Oracle APEX which opens an AI Chat User Interface

Leverages **Generative AI Services** configured under Workspace Utilities

Rendered **Inline** or as a **Dialog**

Configurable **System Prompt** and **Welcome Message**

The screenshot displays the Oracle APEX workspace for 'Application 124' on 'Page 1: Project Dashboard'. The left sidebar shows the component tree with 'Show AI Assistant' selected under 'Dynamic Actions'. The main workspace is divided into three panes: 'Layout', 'Action', and 'Regions'. The 'Layout' pane shows the 'Project Dashboard' page with a 'ChatWithAI' button in the 'TOP OF REGION [Legacy]' area. The 'Action' pane shows the configuration for the 'Show AI Assistant' dynamic action, including fields for 'Name', 'Action', 'Configuration', 'Display As' (set to 'Dialog'), 'Title', 'Initial Prompt', 'Use Response', and 'Quick Actions'. The 'Regions' pane shows a grid of components including Avatar, Badge, Breadcrumb, Calendar, Cards, Chart, Classic Report, Comments, Content Row, Dynamic Content, Faceted Search, Form, Help Text, Interactive Grid, and Interactive Report.

The screenshot shows the 'Assistant' chat interface. It displays a list of 'Open Tasks' with details for 'Project Alpha' and 'Project Beta'. The 'Project Alpha' tasks include 'Milestone Title: Milestone Alpha 1', 'Task Name: Task Alpha 1', and 'Task Status: pending'. The 'Project Beta' tasks include 'Milestone Title: Milestone Alpha 2', 'Task Name: Task Beta 1', and 'Task Status: in progress'. A user query 'What is the status of Project Beta?' is shown, followed by a response stating 'There is no specific task status mentioned for Project Beta in the provided information.' and 'Project Beta details: Milestone Title: Milestone Beta 1'. The interface includes a 'Type your message here' input field at the bottom.

Demo

Leveraging Vector Search Feature - Oracle Database 23ai

Vectors in AI Represent Semantics of Unstructured Data

Such as images, documents, videos, etc.



Vector



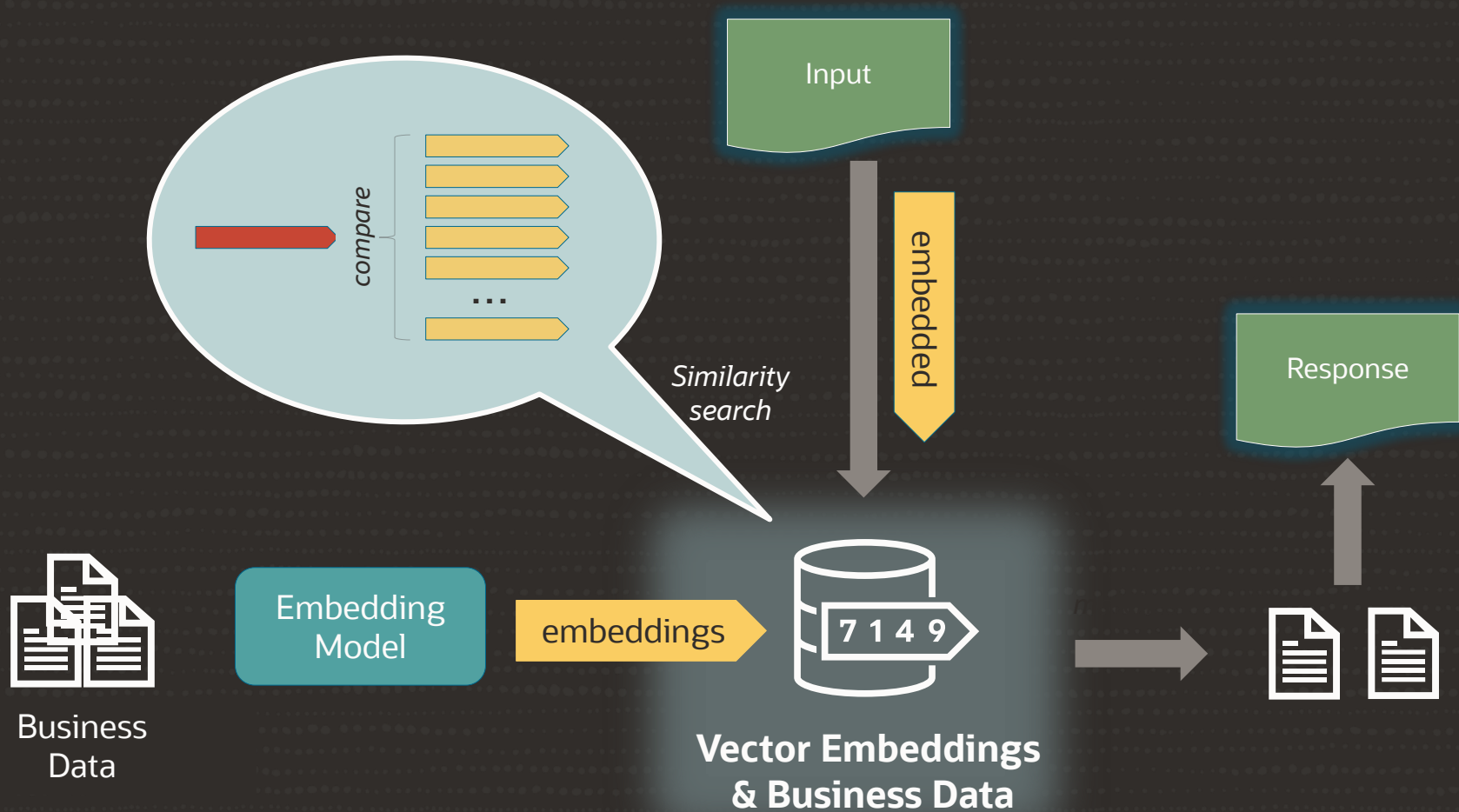
A vector is a sequence of numbers, used to capture the important "features" of the data

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

Vectors are generated using deep learning embedding models

AI Vector Search

Search across your unstructured data

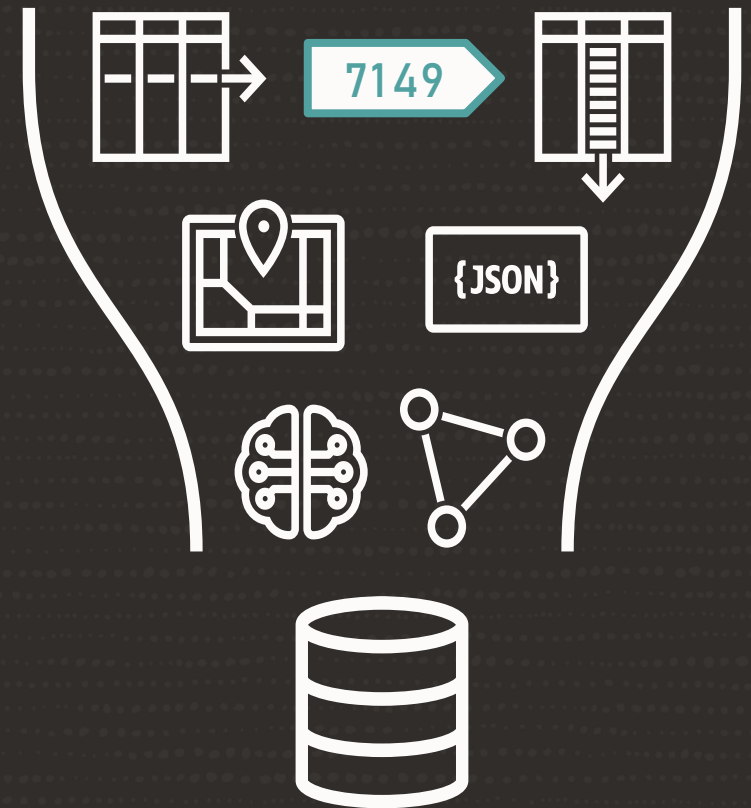


Introducing Oracle AI Vector Search

New set of capabilities in **Oracle Database 23ai**

Query business data alongside vector embeddings

- **Generate** vector embeddings from unstructured data
- **New** VECTOR data type for storing vectors
- **New** SQL syntax and functions express similarity search with ease
- **New** Approximate search indexes packaged and tuned for high performance and quality



Import ONNX (Open Neural Network eXchange) embedding model



```
DECLARE
  L_PAR_URL    VARCHAR2(1000);
  L_RESPONSE_BLOB BLOB;
  BEGIN
    L_PAR_URL := 'https://adwc4pm.objectstorage.us-ashburn-1.oci.customer-
oci.com/p/eLddQappgBJ7jNi6Guz9m9LOtYe2u8LWY19GfgU8fIFK4N9YgP4kTlrE9Px3pE12/n/adwc4pm/b/OML-
Resources/o/all_MiniLM_L12_v2.onnx'
    ;
    L_RESPONSE_BLOB := APEX_WEB_SERVICE.MAKE_REST_REQUEST_B(
      P_URL      => L_PAR_URL,
      P_HTTP_METHOD => 'GET'
    );
    DBMS_VECTOR.LOAD_ONNX_MODEL(
      MODEL_NAME => 'DOC_MODEL',
      MODEL_DATA => L_RESPONSE_BLOB,
      METADATA =>
        JSON(
          '{
            "function": "embedding",
            "embeddingOutput": "embedding",
            "input":{"input": ["DATA"]}'
          )
        );
  END;
```

Add a Vector Column to your Table



```
ALTER TABLE EMPLOYEE_DETAILS ADD EMPLOYEE_INFO_VECTOR VECTOR;
```

Convert Text into Vector Embeddings



```
UPDATE table Employee_details set employee_info_vector =  
to_vector(vector_embedding(doc_model using  
employee_info AS data));
```

Calculate the Vector Distance

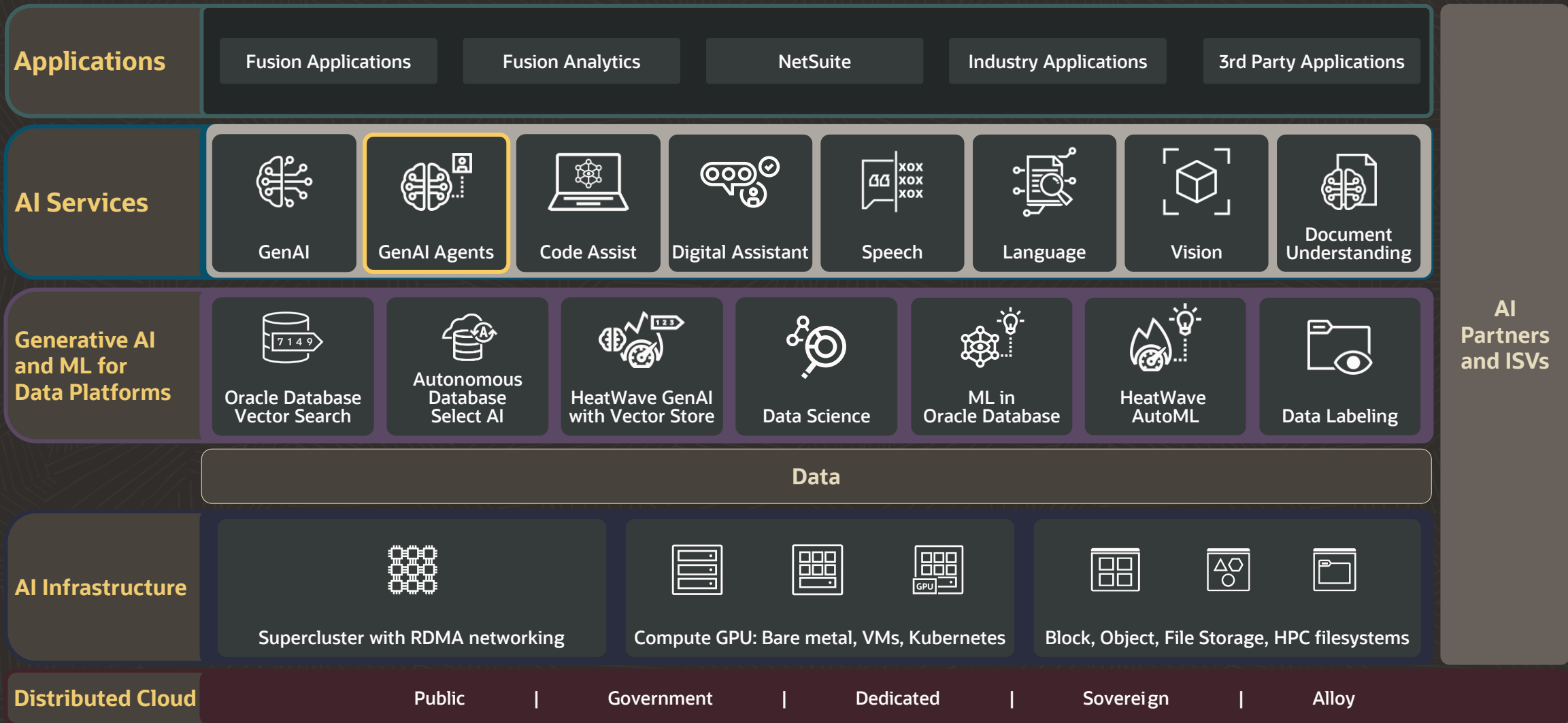


```
SELECT
    EMPLOYEE_INFO
FROM
    employee_details
ORDER BY
    VECTOR_DISTANCE(employee_info_vector, TO_VECTOR(VECTOR_EMBEDDING(DOC_MODEL
USING :APEX$AI_LAST_USER_PROMPT AS DATA)), COSINE)
FETCH EXACT FIRST 10 ROWS ONLY;
```

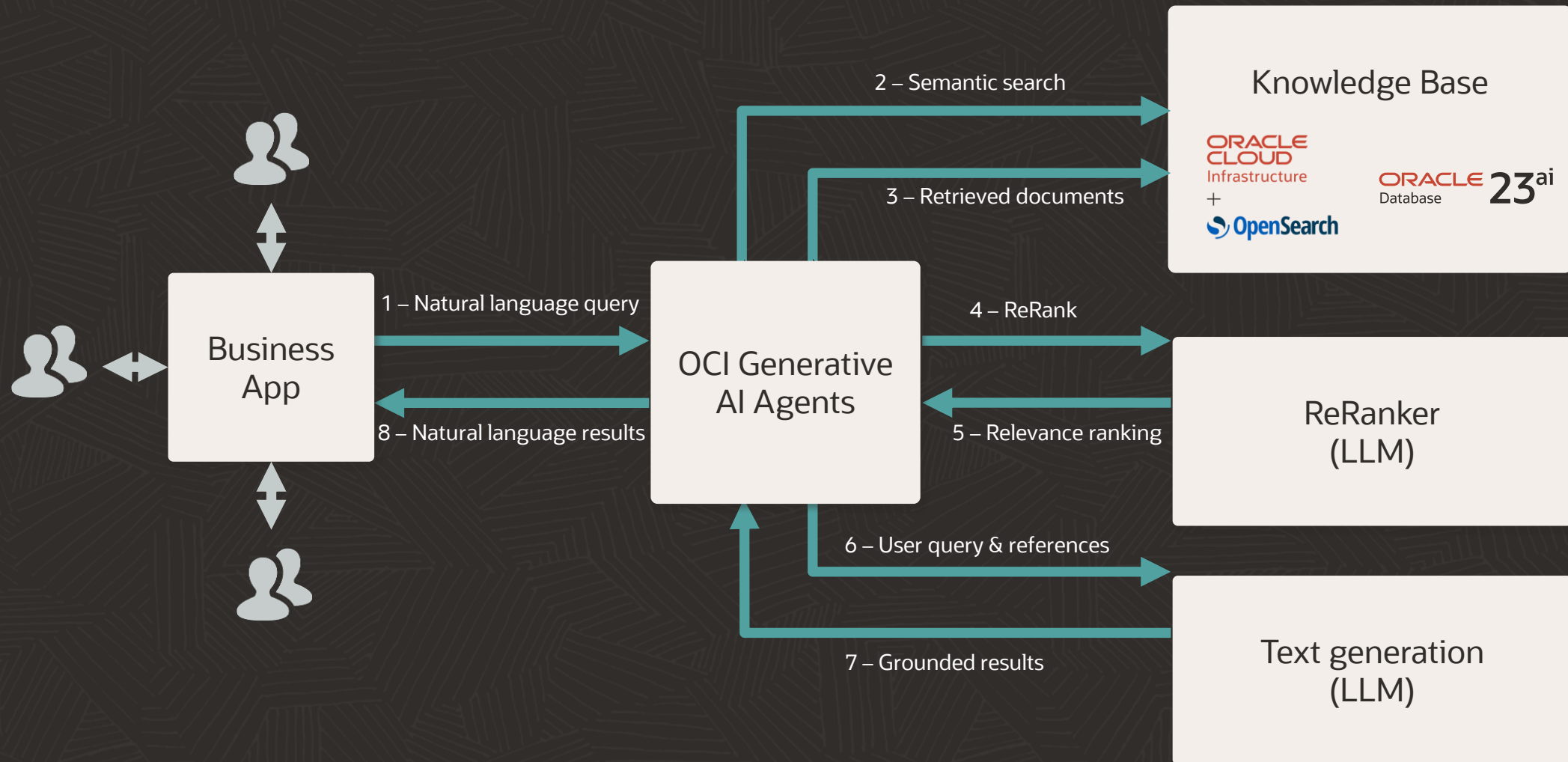
Demo

Integrating Oracle APEX with OCI Generative AI Agents

The Oracle AI Stack



OCI Generative AI Agents: RAG Agent



Demo

Resources

- Lab: Innovative Q&A Interface Powered by Generative AI
apex.oracle.com/go/nyc-genai
- Office Hours: What's New in Oracle APEX 24.2
apex.oracle.com/go/playlist-242
- Oracle APEX Blog: apex.oracle.com/blog

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April 2025

Month

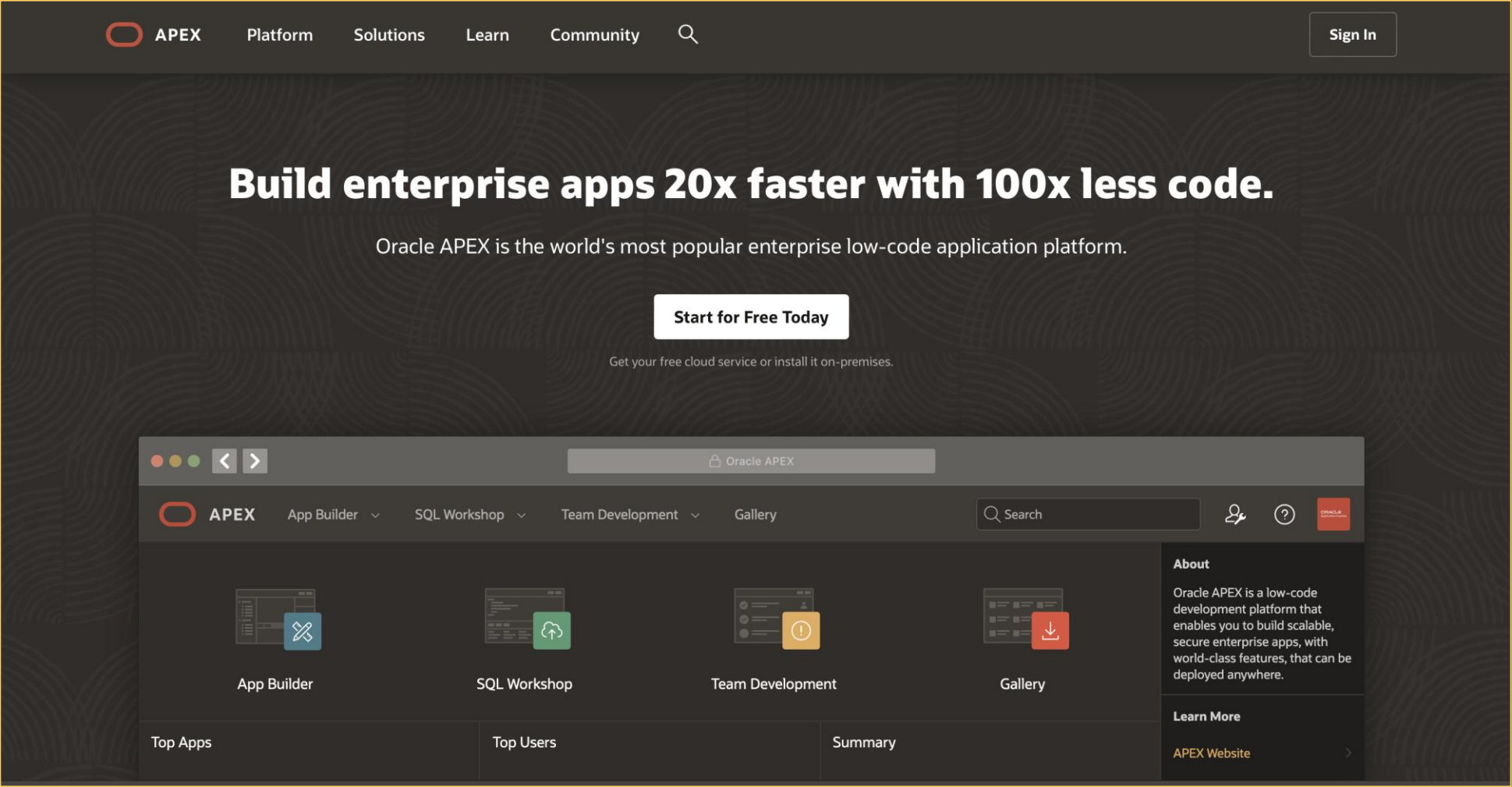
List

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1	2	3	4	5
				Office Hours: Pixel Perfect Printing in APEX with Document Generator 3:00 PM - 4:00 PM 🇬🇧 English		
6	7	8	9	10	11	12
		Event: APEX Bootcamp @ Santa Monica 10:15 AM - 10:15 AM 🇬🇧 English	Webinar: Getting Started with GenDev in APEX 11:00 AM - 12:00 PM 🇬🇧 English	Event: APEX Bootcamp @ Reston 10:15 AM - 10:15 AM 🇬🇧 English	Conference: APEX Alpe Adria 2025 9:00 AM - 4:00 PM 🇬🇧 English	
13	14	15	16	17	18	19
		Webinar: Building Low-code applications with APEX and AI 11:00 AM - 12:00 PM 🇬🇧 English		Event: AUFO APEX 11:00 AM - 12:00 PM 🇬🇧 French	Event: Oracle APEX Roadshow - Hyderabad 4:00 AM - 7:00 AM 🇬🇧 English	
20	21	22	23	24	25	26
27	28	29	30	1	2	3



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Thank You

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data in new ways, discover insights,
unlock endless possibilities.

