

ORACLE | APEX

Oracle APEX 24.1

New Features

Name

Presenter's Title

Organization, Division or Business Unit

Month 00, 2024



*“ We're now building a lot of our applications in **APEX**. And our productivity gains are, again, a factor of **10**. And we build the applications in **one tenth** the time, or **one tenth** the amount of people, or at **one tenth** the cost. But these are not typical low-code applications. These are applications that can scale to **millions** of users and all over the world.”*

- Larry Ellison

Founder & CTO, Oracle

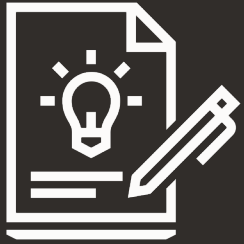
What's New in Oracle APEX 24.1?

- Generative AI Support
- Powerful Enterprise Components
- Next-Gen Data Platform
- New and Updated Components
- Developer Experience
- General Builder Improvements
- Additional Updates and Enhancements



apex.oracle.com

Oracle APEX 24.1: What's New?



Generative AI Support

Context-Aware GenAI for Devs

Easy AI Integration for Apps



Powerful Enterprise Components

Dynamic Data Templating

Enhanced Workflow Engine

Working Copy Compare



Next-Gen Data Platform

Vector Search

Native Server Side JavaScript

JSON Relational Duality

Generative AI Support

Generative AI Service

APEX

App Builder

SQL Workshop

Team Development

Gallery

Search

Toufiq Mohammed

toufiq_genai

Workspace Utilities

Generative AI Services

Create/Edit

Generative AI Service Open AI

Cancel

Delete

Apply Changes

Show All

Identification

Settings

Advanced

Identification

* AI Provider

Open AI

* Name

Open AI

Static ID

open_ai

Settings

Used by App Builder

* Base URL

https://api.openai.com/v1

Credentials

* Credential

credentials_for_open_ai

Advanced

AI Model

gpt-4o

HTTP Headers

Comments

Additional Attributes

Generative AI Service

The Name and Static ID must be unique within the workspace. The developer can select from a list of supported AI Services and specify if the AI Service should be used by App Builder. Only one AI Service can be configured for App Builder. Advanced properties including additional HTTP headers and JSON attributes can be configured.

toufiq toufiq_genai en

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Oracle APEX 24.1.0-24

An abstraction to popular commercial **Generative AI products** like Open AI, Cohere and others

Authenticates using **Web Credentials** in Oracle APEX


Used by **App Builder, AI Assistant & APEX_AI PL/SQL API**

Can be enabled/disabled on APEX **Instance** and **Workspace** levels




Create App from a Prompt

APEX Assistant

 Let's create an app together. Describe the app you want to create, including the data or tables it will use.

Build an app on project tasks, project status, project milestones, project task todos, and projects, that includes pages for a smart filters, classic report, chart, and interactive report.

RT

 Sure, I can create an application called **Project Management Suite** with the following pages:

- Smart Filters on Projects (Smart Filters on **EBA_PROJECTS**)
- Smart Filters on Project Milestones (Smart Filters on **EBA_PROJECT_MILESTONES**)
- Project Milestones Report (Classic Report on **EBA_PROJECT_MILESTONES**)
- Projects Status Chart (Chart on **EBA_PROJECTS**)
- Interactive Projects Report (Interactive Report on **EBA_PROJECTS**)

With the following features enabled: **Install Progressive Web App, Push Notifications.**
Would you like to create the application now? Or, if you have any changes, just let me know below!

Create Application

Type your message here


Generate **Application Blueprint** based on a Prompt

Leverages **APEX Dictionary Cache** to identify relevant tables

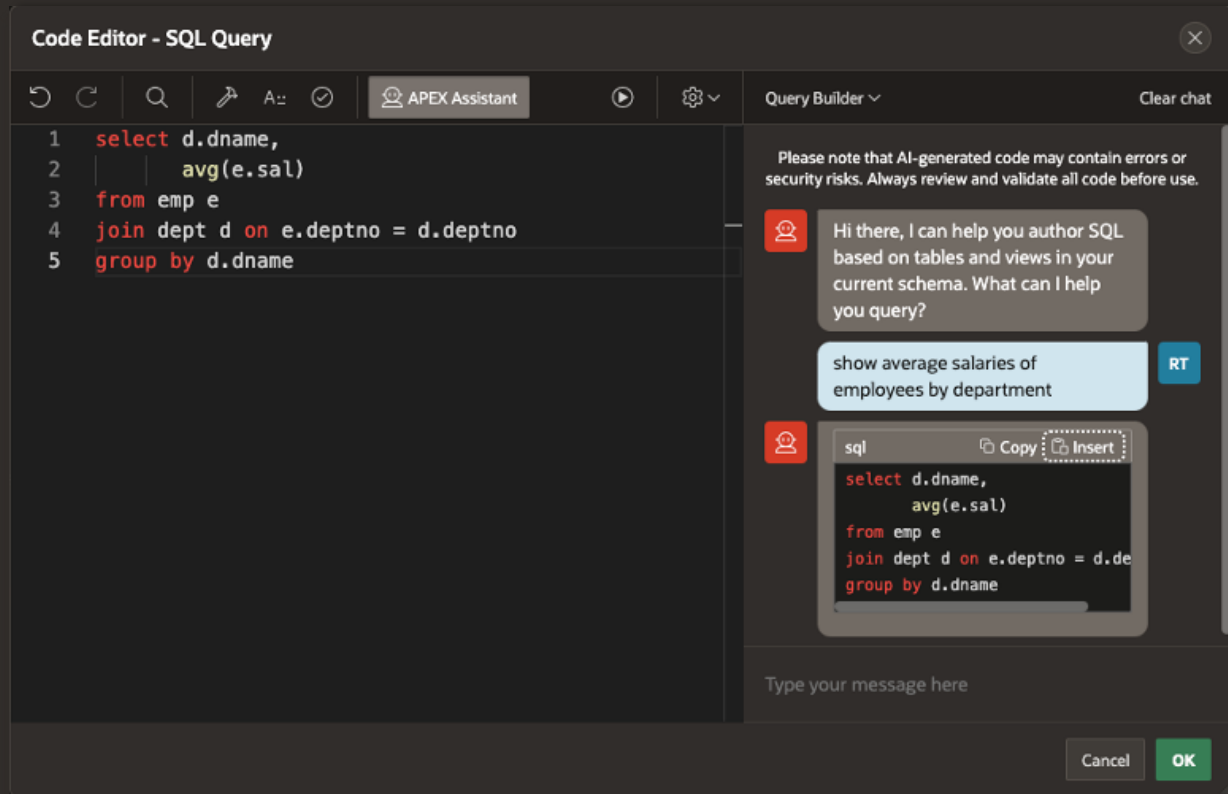
Further, **enhance the generated blueprint** with additional instructions

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APEX Assistant in Code Editors



APEX Assistant in Code Editors leverage **Generative AI Services**

Leverages **APEX Dictionary Cache** to identify relevant tables

Generate SQL Queries for form and report regions using the Query Builder mode.

Generate PL/SQL, JavaScript, HTML, and CSS Code using the General Assistance mode.

Improve & Explain Quick Actions help improve and understand the selected code

Open AI Assistant Dynamic Action

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 image shows the configuration interface for the 'Open AI Assistant' Dynamic Action on the left, and a preview of the rendered dialog on the right.

Configuration Interface:

- Identification:**
 - Name: [Empty field]
 - Action: Open AI Assistant
- Generative AI:**
 - Service: Open AI
 - System Prompt: You are an expert in marketing. You will be provided with a product description and seed words, and your task is to generate product names.
 - Welcome Message: Hey, How may I help you?
- Appearance:**
 - Display As: Dialog
 - Title: [Empty field]
- Initial Prompt:**
 - Type: None
- Use Response:**
 - Type: Item
 - Item: P1_RESPONSE
 - Button Label: Use this
 - JavaScript Detection Expression: [Empty field]

Rendered Dialog View:

Learn More [Close]

Welcome! How may I help you?

what language courses are taught here? [TM]

The language courses taught here are Japanese and Spanish.

what advanced courses are taught here? [TM]

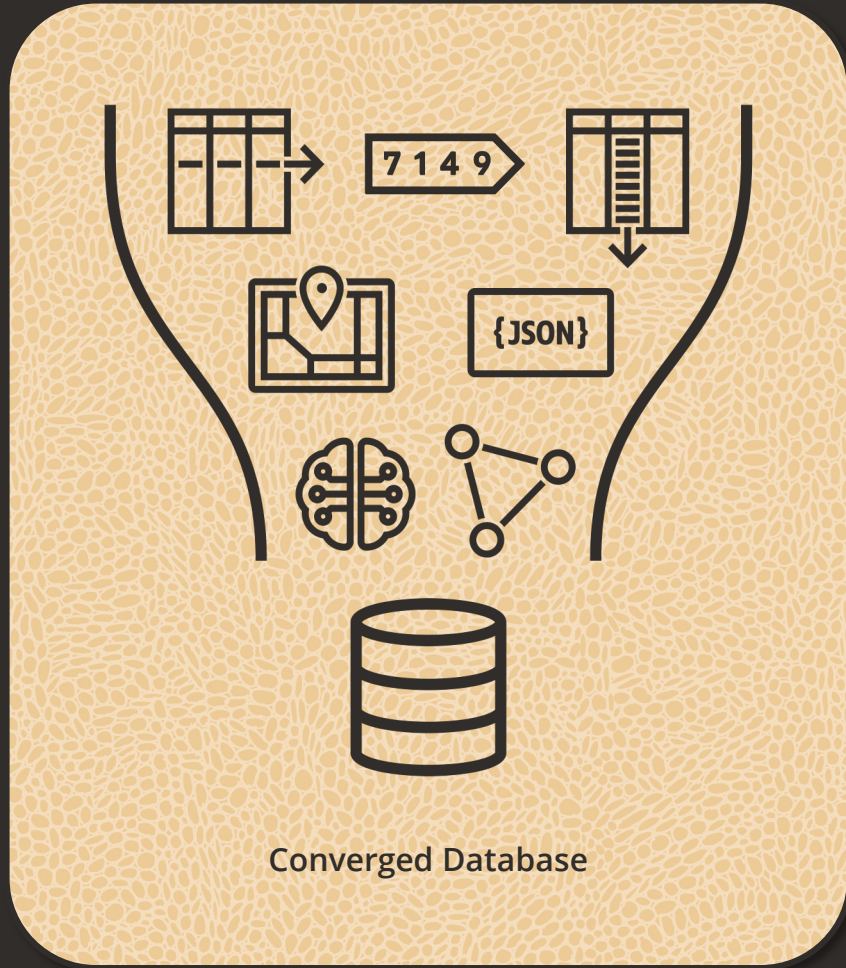
The advanced courses taught here are:

- AP Statistics
- AP English Literature and Composition
- AP U.S. Government and Politics
- AP United States History
- AP English Language and Composition

Type your message here

Next-Gen Data Platform

Oracle AI Vector Search - Overview

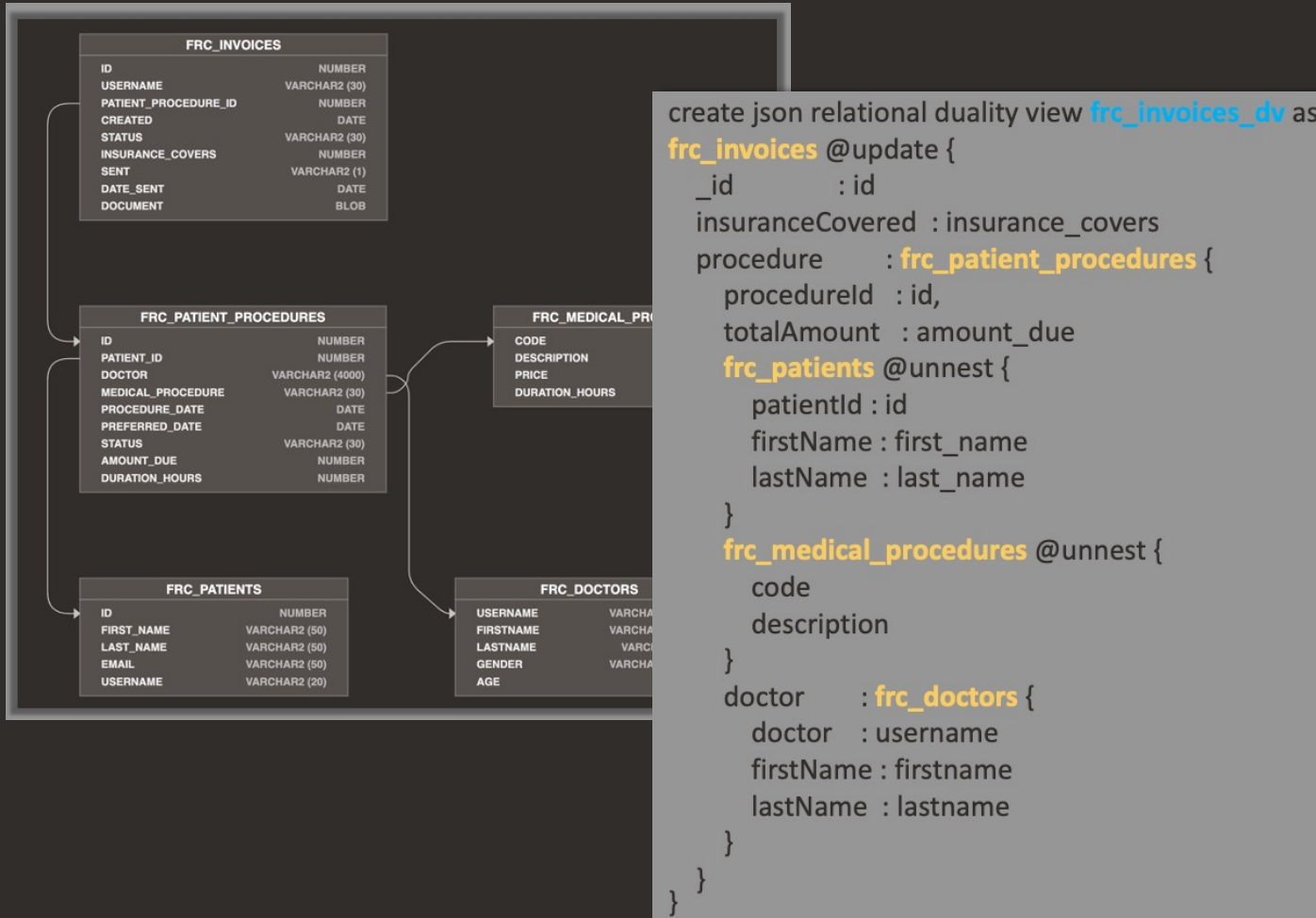


Vector Data Type and **Vector Operations**
Natively implemented in Oracle Database

Enables searches on **Business Data** to be combined with **Semantic Searches**

Allows interactions with **Large Language Models (LLMs)** to be augmented with business data

JSON Relational Duality

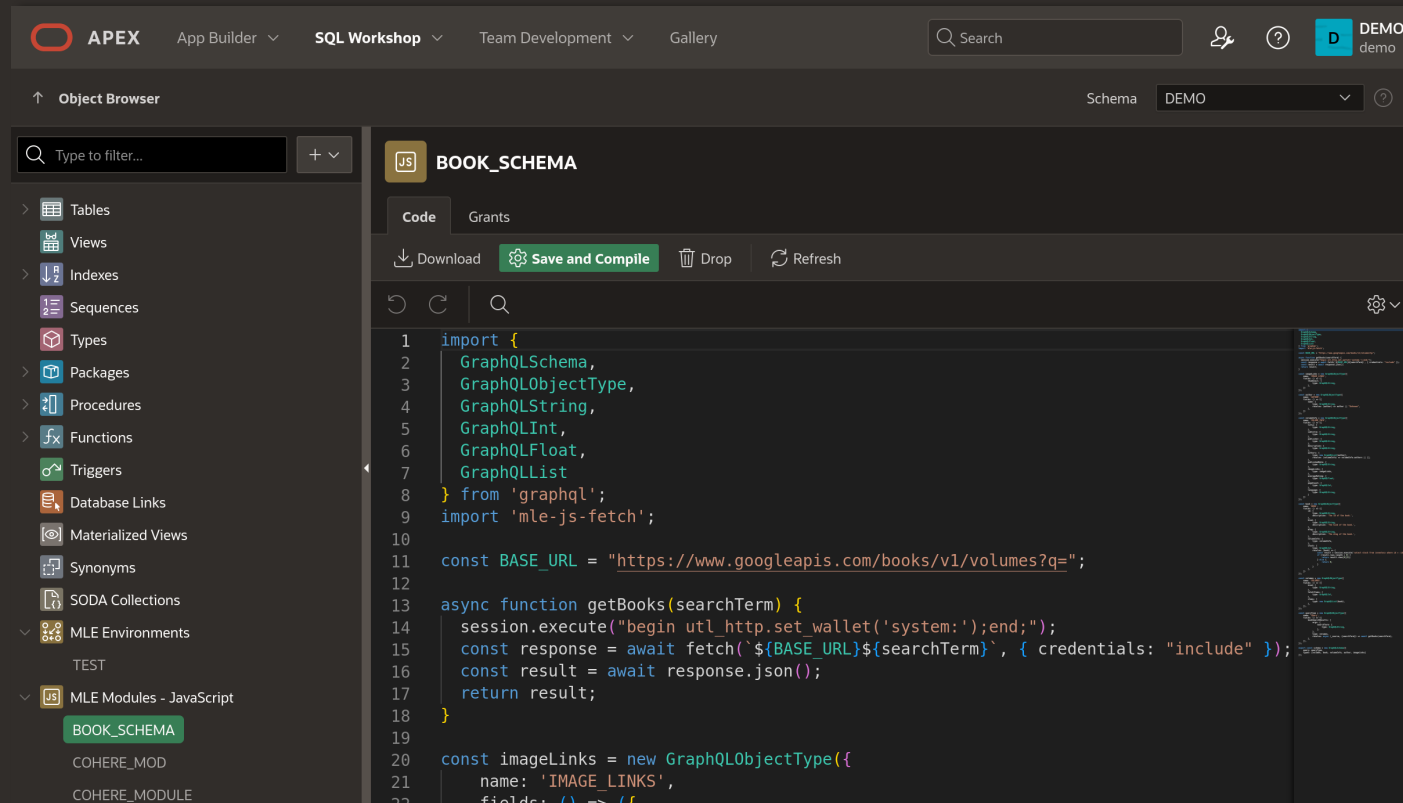


Leverage the **power of relational** and the **simplicity of JSON development** approaches all within a **single app**

By creating simple **JSON Duality views** on top of relational tables you can build apps that use documents to query and update the underlying data sets

APEX apps running on **Oracle Database 23ai** can access the same data as a set of JSON documents or as relational tables and columns **without data duplication**.

Server-Side JavaScript for Business Logic



MLE allows you to **run JavaScript** directly in the Oracle Database

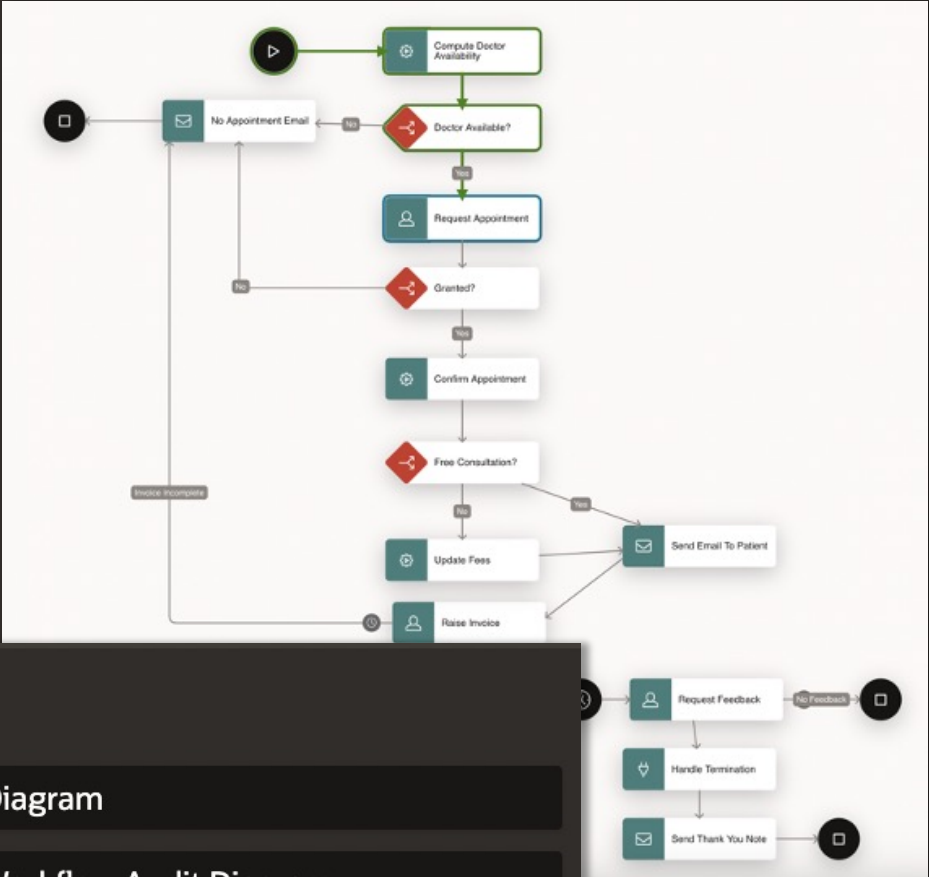
Create **JavaScript modules** as schema objects that are stored persistently in the database.

Oracle APEX automatically maps the **JavaScript data types** to **Oracle Database types**.

Import and Leverage many **open-source libraries** from over a million JavaScript modules available online

Powerful Enterprise Components

Workflow Enhancements



Identification

Name	Diagram
Title	Workflow Audit Diagram
Type	Workflow Diagram

Workflow Diagram region displays a read-only, real-time visual representation of the workflow's progress, highlighting completed nodes and the workflow route

Public APIs to fetch and handle **purgeable task** and workflow instances **before purging**.

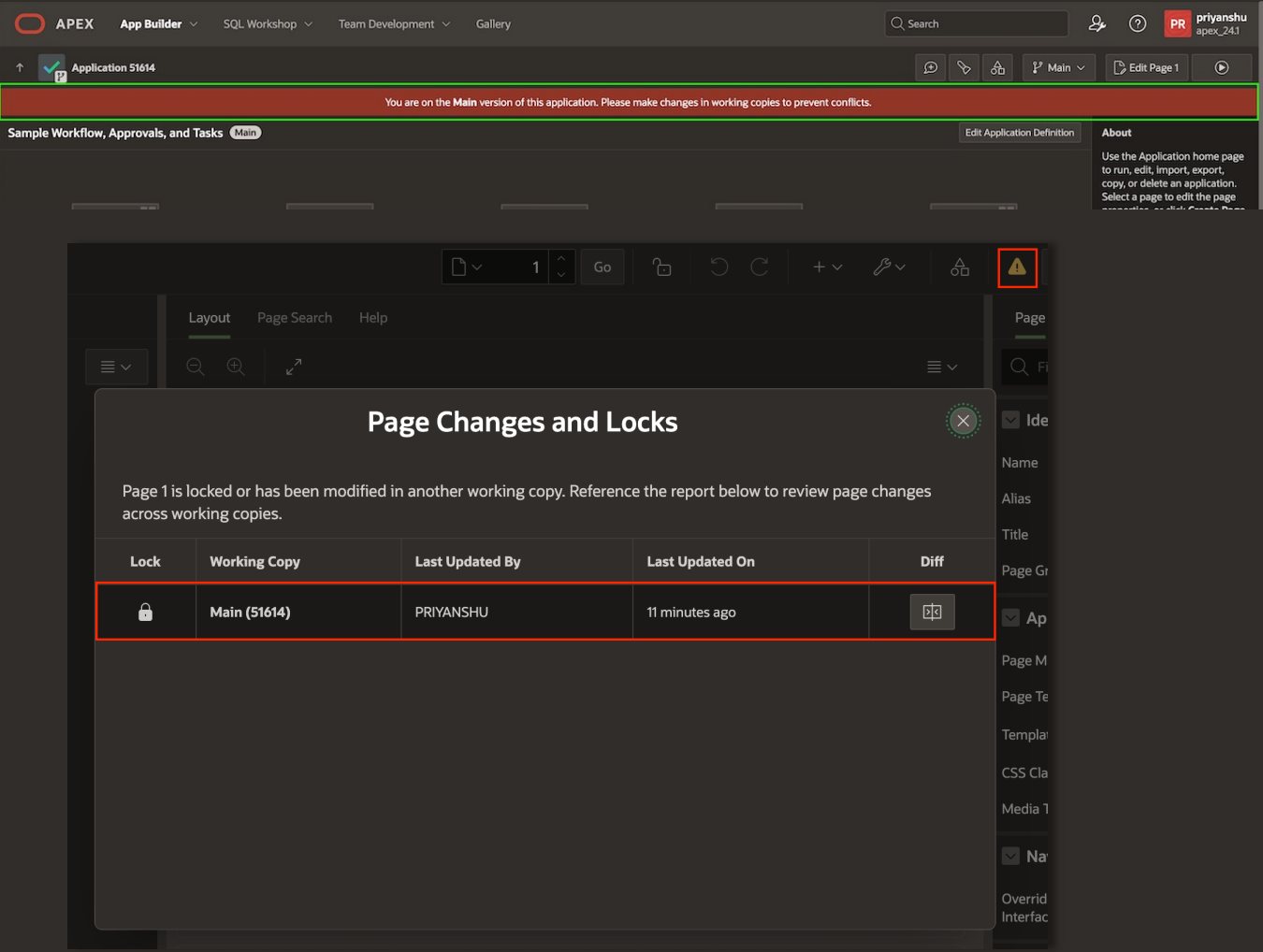
Termination Function for Asynchronous Activity Plugins

New **Workflow Dashboard** Page

Workflow **Instance ID** Available for **Debug Messages**



Working Copy Enhancements



Visually indicate **changed** and **locked** pages by **another working copy or main**

Visual Indicator when you are on the main application in page designer


Compare page with the main utility

Report to see which working copies have **modified or locked a page** and view the differences between copies.

YAML diff editor **shows the last updated date** to help developers identify the latest version.



Pixel-Perfect Reports using OCI Document Generator Pre-Built Function



Sample Document Generator
Oracle

▼ Identification

Name

Print Report

Type

Print Report

▼

☰

Execution Chain

None

▼

Settings

Query

Employees

▼

>

employees_overview

Attachment

▼

ORACLE

Order Form

Customer Details:

Twila Hilliard
Email: twila.hilliard@internalmail

Date: 2023-08-19

Order Number: 355

Item #	Product	Qty	Unit Price	Total
38	Girl's Pyjamas (Red)	2	\$11.00	\$22.00
36	Women's Trousers (Blue)	4	\$29.51	\$118.04
TOTAL				\$140.04

Thank you for your order!

Leverage the **OCI Document Generation Pre-Built Function** to print pixel-perfect reports

Generate PDF documents from a combination of **JSON data** and **Microsoft Word templates**.

New page process type - **Print Report**.



Template Components Enhancements

Current Selection
100068:100069:100070

☐ Select All

<input checked="" type="checkbox"/>	<div>HM</div> <div>Arts</div> <div>Henri Matisse</div> <div>Gender: Male, Born: 1869 , Died: 1954</div>	27.388567
<input checked="" type="checkbox"/>	<div>RB</div> <div>Science & Technology</div> <div>Robert Boyle</div> <div>Gender: Male, Born: 1627 , Died: 1691</div>	26.560899
<input checked="" type="checkbox"/>	<div>HIO</div> <div>Politics</div> <div>Henry III of France</div> <div>Gender: Male, Born: 1551 , Died: 1589</div>	26.560281
<input type="checkbox"/>	<div>SOA</div> <div>Politics</div> <div>Sargon of Akkad</div> <div>Gender: Male, Born: -2360 , Died: -2284</div>	26.553486
<input type="checkbox"/>	<div>HER</div> <div>Politics</div> <div>Heraclius</div> <div>Gender: Male, Born: 575 , Died: 641</div>	

▼ Row Selection

Type

Current Selection

Page Item

None

Focus only

☒ Single Selection

Multiple Selection

Declarative Selection Support for Template Component Reports

Template Components **without Data Source - Static Values**

Slots for Template Components



New and Updated Components

New Select One and Select-Many Item Types

Select Countries

Afghanistan × Australia × Antarctica ×

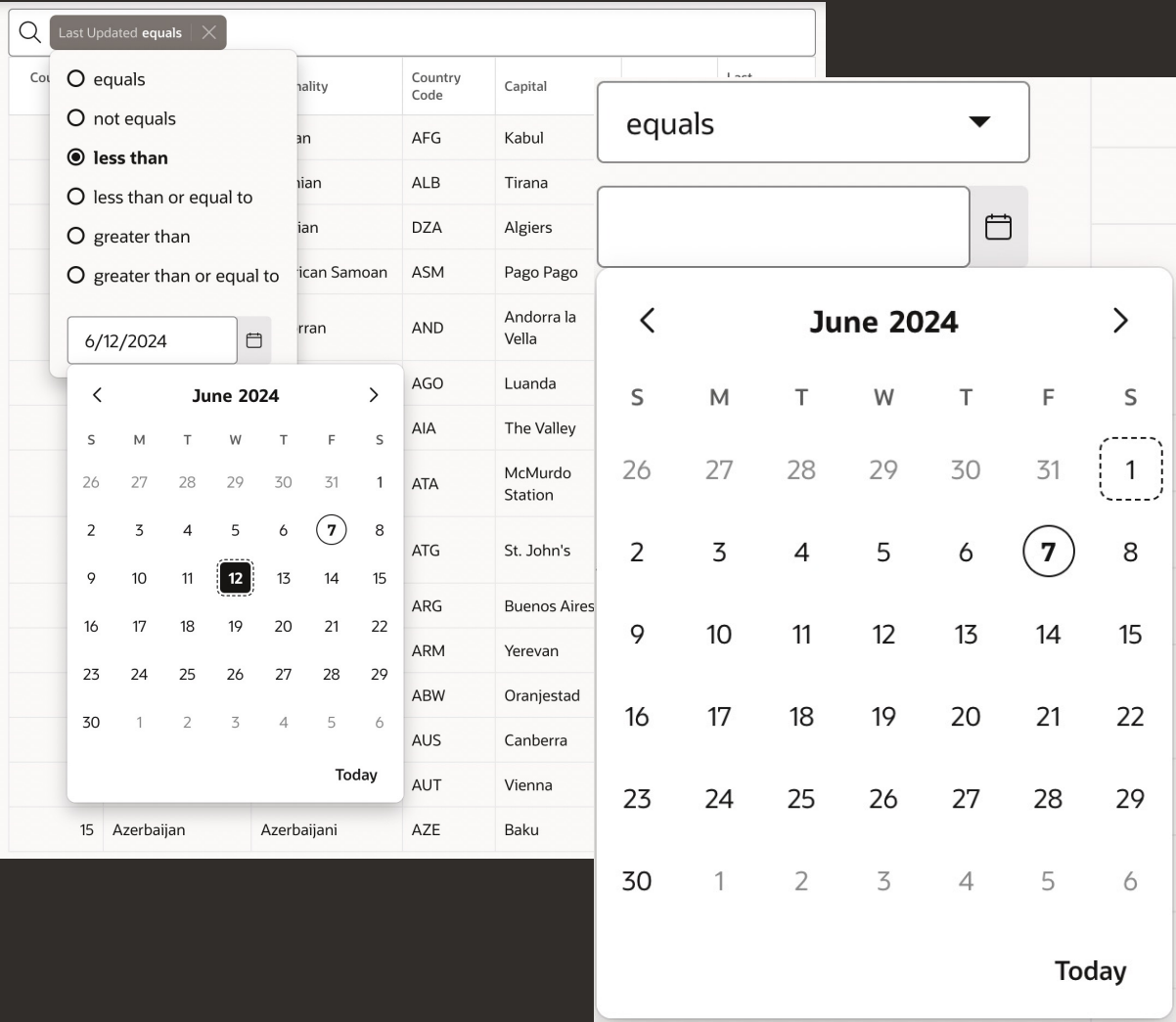
- ☒ Afghanistan
- ☐ Albania
- ☐ Algeria
- ☐ American Samoa
- ☐ Andorra
- ☐ Angola
- ☐ Anguilla
- ☒ Antarctica
- ☐ Antigua and Barbuda
- ☐ Argentina
- ☐ Armenia
- ☐ Aruba
- ☒ Australia

An **LOV based item**, that allows only entries included on the data set, like a select list.

Support includes:

- Custom HTML for the choices with Template Directives
- Icons
- Groups
- JSON Session State
- Multi-column search, and displaying
- Multi-select, user can select more than one option, and the dropdown remains open.
- Show chips as delimited list, when the focus is not on the Select Many item

Date Picker Support in Faceted Search and Smart Filters



Date Picker support for Input Facets and Manual Range Inputs on Faceted Search and Smart Filters Regions.

You can set/use your own **format mask** for date representation.



Declarative BLOB/CLOB File Download Support

Action

Identification

Name

ActionDownload

Settings

Multiple Files

View File AsAttachment

Source

SQL Query

Items to SubmitP73_ID_1

Identification

NameDownload - Attachment

TypeDownload

Execution ChainNone

Settings

Multiple Files

View File AsAttachment

Source

SQL Query

Execution

Sequence10

PointBefore Header

Run ProcessOnce Per Page Visit (default)

New “Download” **Dynamic Action**

New “Download” **Process Type**

Download **multiple files as a zip archive**

Support **CLOB/VARCHAR2 data types** as file content

Show file as **attachment** (download) or **inline** (inside browser)

Server Side Geocoding

A **new process type, Server Side Geocoding**, is available on **Oracle APEX Autonomous Database instances**.

This allows users to turn a **postal address to a coordinate on the server** independently from the UI.

Server Side Geocoding is supported for Page Processes, Automation Actions, Task Definition Actions, and Workflow Activities

Multi-Domain Support for SAML Authentication

APEX now supports the "**AssertionConsumerServiceIndex**" attribute in SAML authentications.

Administrators can configure **SAML callbacks for multiple domains**.

See Supported Callback URLs in the Instance Administration settings under Security, SAML Authentication, or [Configuring SAML Sign-In](#) in Oracle APEX Administration Guide.

Dynamic Action Enhancements

New **'Input'** Dynamic Actions Event

- The browser event Input is now available when configuring a Dynamic Action. The event is fired every time the value of the element changes. This is different from the Change event, which only fires when the value is committed--for example, by pressing the Enter key or selecting a value from a list of options.
- The Input event is not fired when JavaScript changes an element's value programmatically.

New **Quick Pick options** for Dynamic Actions

- Execute JavaScript Code and Execute Server-side Code are now available from the Quick Pick options.

Improvements to REST Source Infrastructure

Introduction support for hierarchical REST Source Data Profiles. The features at a glance are:

- Introduce "**Array Columns**" in REST Data Source Data Profiles, which allow to model the JSON hierarchy of a REST Data Source.
- APEX Components can now **consume data from REST Sources on every hierarchy level.**
- APEX is no longer limited to REST APIs returning "**flat**" **JSON** responses.
- Array Columns and Hierarchies supported in **REST Source Catalog** as well.
- Full support in **APEX_EXEC PL/SQL API**: build DML requests with Array columns, and programmatically fetch hierarchical data from REST Sources
- New REST Source parameter type **Parent Column** allows to pass the value of a Parent IG in a Master Detail relationship to the REST Source.
- New "**Is Common**" Data Profile Column attribute. This allows our Create Page wizards to focus on the important attributes when creating new pages.

Support for Database Credentials

Web credentials can now reference a database credential to store the Client ID and Client Secret.

The web credential type must be Basic Authentication or OAuth2 Client Credentials. This feature is only available on Oracle Database 23ai or Autonomous Database release 19c or later.

The database credential is completely maintained by the database, and APEX does not have access to the stored secrets

- **Web Credentials** of the **Basic** and **OAuth** type can now use a **Database Credential** to store the secret.
- Use **DBMS_CREDENTIAL** or **DBMS_CLOUD** packages to create such a credential.
- Configured at the Web Credential level. Components like REST Sources, APEX_WEB_SERVICE or REST Enabled SQL are unchanged.

Developer Experience

Component Groups

Other Components

Lists of Values

24

Plug-ins

13

Component Settings

Shortcuts

Map Backgrounds

Component Groups

3

Subscription

This is the "master" copy of this component group.

No component group subscribed to this component group.

Components

Search

Go

1. Primary Report

Actions

Assign Components

Component Type	Component	Actions
Application Setting	DEMO_NOTIFICATION_EMAIL	
Email Template	Job Change Notification	
REST Data Source	Document Generator	

1 - 3

Created: 2 seconds ago - PRIYANSHU

Updated: 2 seconds ago - PRIYANSHU

A new shared component, **Component Groups**. It is a collection of other shared components.

Allows you to easily copy, subscribe to, or refresh all components in the group with a single action.

All the shared components that support subscription can be added to a component group

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Improved Shared Components Subscriptions

APEX 23.2 added new subscription features to shared components, including setting subscribed components as read-only, automatic dependency resolution, a subscription status column, and bulk refresh or deletion of subscriptions.

Starting APEX 24.1, these features are now available on the following components:

- Lists
- Data Load Definitions
- REST Data Source
- Authentication Scheme
- Authorization Scheme
- List of Values
- Plug-ins
- Shortcuts
- Search Configurations



Multi-Value Item Type Support and Custom Separators Support

The Shuttle, Select Many, Select List, Combo box, List Manager, and Popup LOV support a **custom separator character** for delimited list string values or a JSON array value.

Plug-in developers can add the same functionality to their own multivalued item plug-ins.

- New Custom Separator support for the Shuttle, Select List, Combo box, List Manager, and Popup LOV item types.
- Provides a generic solution to handle developer-defined separators for multi-value-based items, to prevent individual item implementations.

Built-in Oracle TEXT Search functions

APEX_SEARCH is now extended with two Oracle Text Query functions, **Search Engine** and **Expert Search**.

These functions enable advanced full text search features including fuzzy searching and proximity search.

You can access these functions programmatically with APEX_SEARCH.QUERY_SEARCH_ENGINE and APEX_SEARCH.QUERY_EXPERT_SEARCH.

Readable Export Enhancements

Application Export has a readable/diffable version in YAML format. With APEX 24.1, we have extended this support to include:

Export Individual Page in Readable Format

- Pages can now be exported in readable YAML format through the Export Page option in App Builder, or through sqlcl/command line. You can use this method to compare different versions of a page in a readable format.

Improvements for better diff analysis

- Exporting in readable format will default "Original IDs" to Yes.

Application level readable export-only export by setting 'Readable Format' switch to on.

Include Audit Information in Readable exports

- This feature will allow developers to optionally include audit information in export files. Audit information options include None, Names and Dates, Dates Only.

General Builder Improvements

Builder Extensions Enhancements

This feature enables APEX applications installed in a workspace, that is configured to host “Extensions”, to be invoked and used from other workspaces on the same instance.

The Extension application, if read-access is granted by the invoking workspace, to access the application meta-data (views) of that invoking workspace.

Feature overview:

- New Builder Extension Sign-in Authentication Scheme, which enables opening the Extension app from a Builder session without having to sign-in with username/password
- Publish Extension apps using the Extension Menu
- Workspaces can subscribe to Extension Menus from Extension Workspaces and invoke the Extensions published
- New API, that allows accessing repository data of workspaces, that have granted read access, to an Extension workspace in Automations or PL/SQL in APEX session context.

Page Designer Improvements

Resizable icon picker modal dialog, for better usability.

New Name Attribute for Regions - similar to pages, regions now support both Name and Title attributes.

Copy this Page' menu option - renamed menu option from 'Page as Copy', to be more intuitive, and streamlined the copy page wizard, by reducing the number of wizard steps.

New 'Show Processing' attribute added to page buttons when 'Submit Page' action is selected. This will help prevent users from double-clicking, and submitting the page twice.

New 'Alternative Label' attribute for Interactive Report columns, to use in dialogs and in various column heading placements. Use an alternative label when the heading contains extra formatting such as HTML tags.

New Template Option to hide empty values on Classic reports using templates "Value Attribute Pairs - Column" and "Contextual Info".

App Builder Enhancements

Spotlight Search Enhancements

- Search results are shown in categories; Results have their search term highlighted.

Component Export/Import with Offsets

- To add support for importing and exporting components with offsets, in the development environment. With previous releases, this is only possible to do this on the command line.

New process type "Server Side Geocoding"

- This feature introduces a new process type "Server Side Geocoding" to APEX ADB instances. This will allow users to perform server-side geocoding (turning a postal address to a coordinate) independently from the UI as well as automating their geocoding processes using Automations.

Additional Updates & Enhancements

Translation of Runtime Messages into Ukrainian and Vietnamese

APEX now supports the translation of runtime messages into **Ukrainian** and **Vietnamese**, extending our language support to **34 languages**.

APEX supports the following languages: Arabic, Brazilian Portuguese, Croatian, Czech, Danish, Dutch, Finnish, French, French - Canada, German, Greek, Hebrew, Hungarian, Icelandic, Italian, Japanese, Korean, Norwegian, Polish, Portuguese (Portugal) (pt), Romanian, Russian, Serbian - Cyrillic, Serbian - Latin, Simplified Chinese, Slovak, Slovenian, Spanish, Swedish, Thai, Traditional Chinese, Turkish, Ukrainian, and Vietnamese.

Universal Theme Updates

Improved **Content-Security-Policy** for Universal Theme

Redwood Light Enhancements

- Minor UI enhancements for Avatars, Badges, Combobox & LOV chips, File Drop Train (Wizard), Input focus styles, IG & IRR filter/chips and Page header

Accessibility Improvements

Improved read-only item state

- This feature introduces changes to support accessible rendering of read-only items.
- New APIs added, and the following native item types use it: Color Picker, Combobox, Date Picker, Number, Display Only, Popup LOV, Select List, Select One, Select Many, Switch Text, Textfield, Text with Autocomplete, and Textarea

Accessibility-focused help text

- There are many attributes that are very important for accessibility. To simplify the process and emphasize the significance of these attributes, new accessibility-specific help text has been added to these attributes in Page Designer, aiming to better guide developers into creating accessible APEX apps.

Continuing from the work done in APEX 23.2 improving the development environment user experience for all users, APEX 24.1 further improves the developer experience when building APEX apps.

Numerous other accessibility-focused bug fixes.

PL/SQL API Updates

APEX_APP_OBJECT_DEPENDENCY

- Analyse APEX applications and report all references to database objects by page and application using this new PL/SQL API.
- Allow APEX developers to have an overview, and run analysis, on all database objects their uses within each application.
- Report all used database objects by an application like tables, packages, procedures, functions, etc.
- For example, find all occurrences where a column of a table or view is used throughout an application.

APEX_AUTOMATION

- New TERMINATE function to terminate a currently executing automation, and now deprecating an existing function, ABORT.

APEX_EXEC

- New DESCRIBE_QUERY function to describe columns and data types of a data source (Local, REST Source or REST Enabled SQL).

PL/SQL API Updates

APEX_INSTANCE_ADMIN

- New EXPIRE_FND_USER_ACCOUNTS, MAX_LOGIN_FAILURES, and ACCOUNT_LIFETIME_DAYS parameters added to the list for use with SET_WORKSPACE_PARAMETER and GET_WORKSPACE_PARAMETER, to control account locking on runtime-only instances.
- New p_grant_apex_privileges parameter added to the ADD_SCHEMA procedure, when add a workspace schema.
- New CREATE_OR_UPDATE_ADMIN_USER procedure signature 2, accepting one parameter, p_username. Create an instance administration user account (i.e. a user in the INTERNAL workspace). If the account already exists, unlock it. This creates or updates the account with a random password, which is not needed when the builder authentication is Database Accounts.

APEX_PLUGIN_UTIL

- New PRINT_READ_ONLY API that handles the rendering of read-only items. This new API should be used instead of the existing apex_plug_util.print_display_only.

JavaScript Library Upgrades

- Oracle JET 16.0.1
- FullCalendar 6.1.11
- Monaco Editor 0.47.0
- MarkedJS 12.0.1
- Less.js 4.2.0
- DOMPurify 3.1.2
- Terser 5.30.3
- Map Region: Upgrade Mapbox to MapLibre 4.0.1
- TinyMCE 6.8.3
- PrismJS 1.29.0
- csso 5.0.5
- cropperjs 1.6.1
- Turndown 7.1.3
- Font APEX 2.3
- Oracle Rich Text Library



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Oracle APEX Training & Certification

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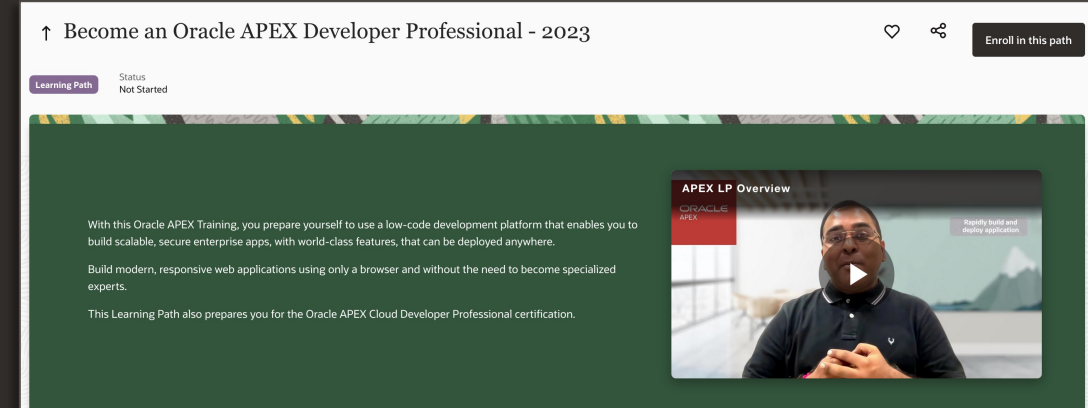
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Empowering Low Code Apps with AI



Learn the latest advancements of **AI in Oracle APEX**

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Earn **APEX + AI Champion** Badge on completion



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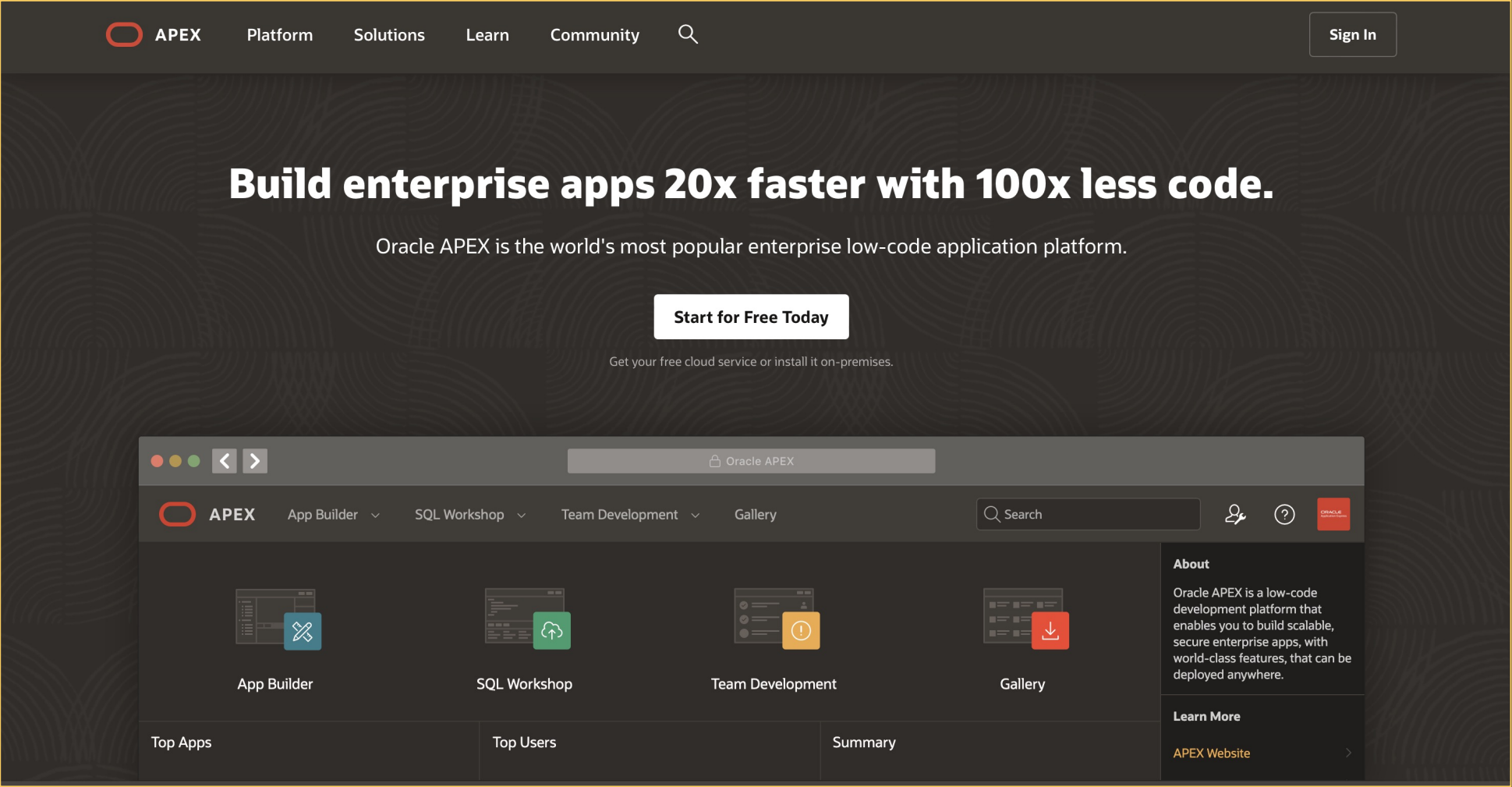
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data in new ways, discover insights,
unlock endless possibilities.

