

ORACLE

# CI/CD with APEXlang

And a bit of AI

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# Safe harbor statement

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# APEXlang



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What If APEX Was Git-Friendly? Now It Is...  
Code It. Git It. Ship It.

# Introducing APEXlang

APEXlang is a **human-readable language** that defines Oracle APEX applications as files, **enabling modern file-based workflows** and **unlocking future AI-powered development**.

## What is APEXlang?

### Language for APEX

- Defines every aspect of an APEX application

### Human-readable file format (.apx)

- Easily imported/exported from the APEX engine

### Highly abstracted

- Focus on what, not how

### Documented public grammar

- Enables tool integration and ecosystem growth

## Why APEXlang?

### Version Control Friendly

- Enables GitHub-based artifact management, diff & merge

### AI-Ready

- Easily generate and modify apps, pages, and components

### Enables development in VSCode

- Works with both assistant tools and traditional IDEs

### Enables Static Analysis

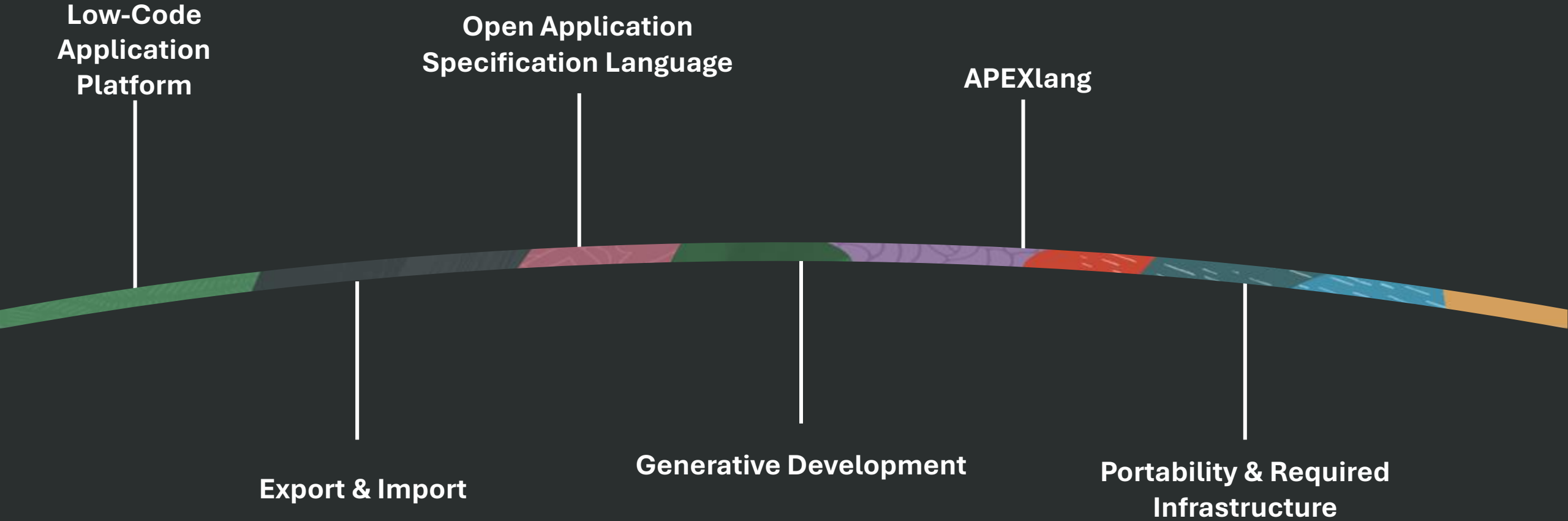
- Supports best practices and security reviews

### Open & Differentiated

- Unlike proprietary competitors

# The Evolution of APEXlang

*...from CI/CD tooling to AI-native application development*



# APEX DSL Goals



Exceptionally human readable with support for diffing and merging.



Long term standard APEX export import format definition replacing SQL script imports.



No runtime components (strictly import/export).



Support for modifications with primary use case being edits to existing applications with syntax validation (merging).



Support “include” based factoring of themes and potentially other components to dramatically reduce file size.



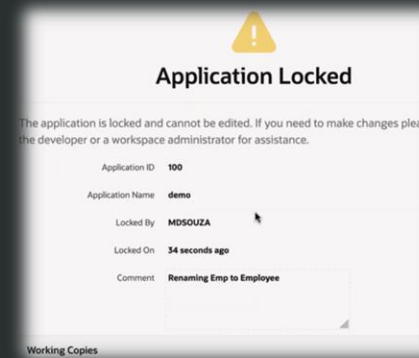
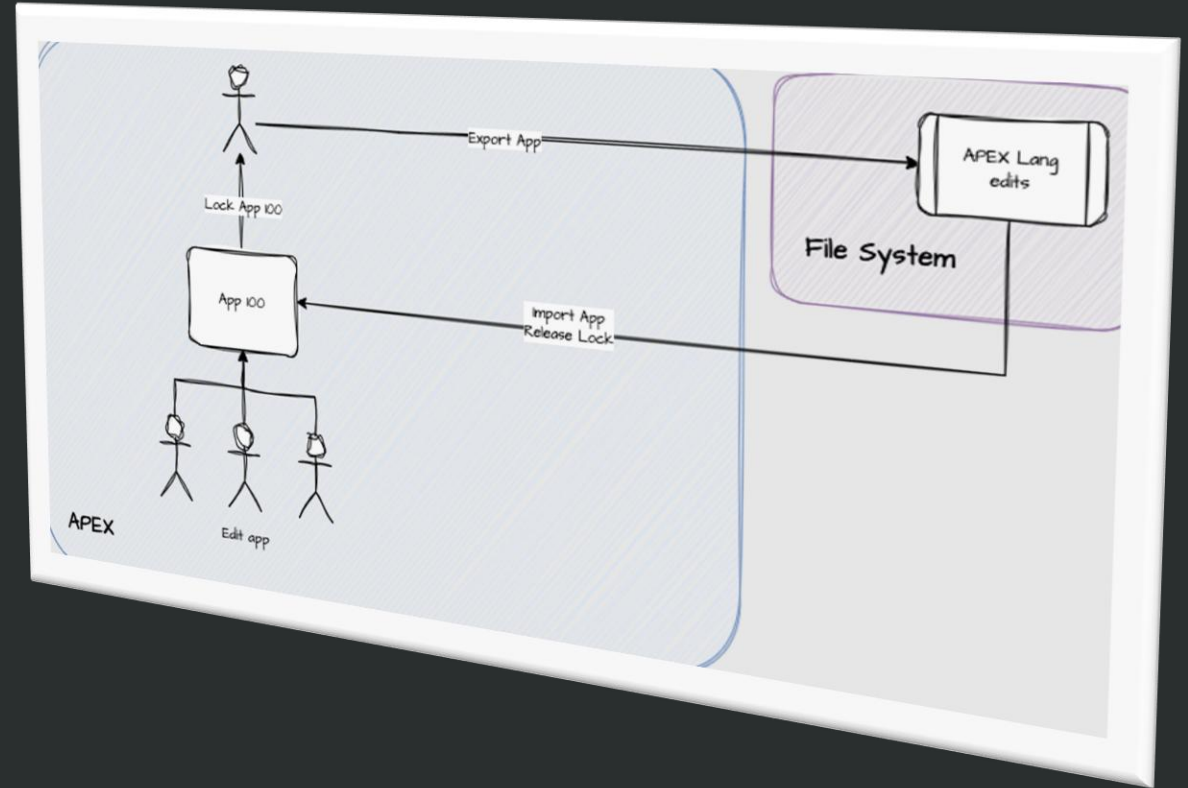
Facilitate SQLcl static analysis to enforce best practice as well as automated App evolution

# Use Cases

Fill the missing gaps for APEX

use\_cases:

- human\_readable:  
"Structured, understandable text."
- modifiable:  
"Change code directly."
- version\_controlled:  
"Git-friendly like your favorite repo."
- installable:  
"Script it. Ship it."
- bulk\_updates:  
"Change what you want at once."
- enterprise\_governance:  
"Audit logs, traceability. CTOs love it."
- ai\_friendly:  
"ChatGPT understands it. Scary, right?"



# Project Structure

## Left side:

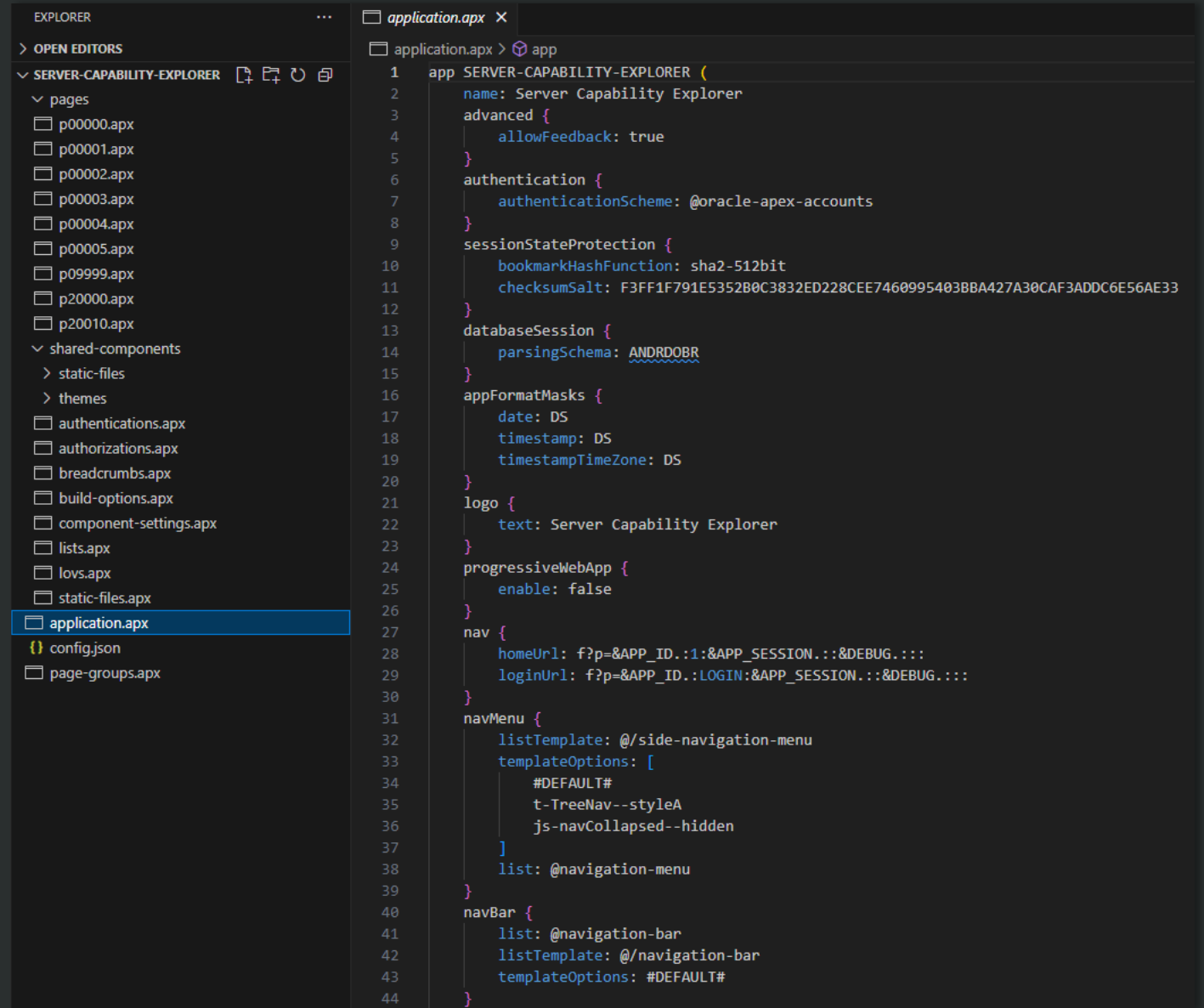
A structured project with folders for pages, shared components, and the main app definition in application.apx

## Right side:

The Test app is defined in clear text — including name, version, authentication, authorization, session settings, security, globalization, and logo.

## Why it matters:

APEXlang turns APEX apps into **readable code**



The screenshot shows an IDE interface. On the left, the Explorer pane displays a project structure for 'SERVER-CAPABILITY-EXPLORER'. It includes a 'pages' folder with files p00000.apx through p20010.apx, a 'shared-components' folder with sub-folders 'static-files' and 'themes', and several .apx files: authentications.apx, authorizations.apx, breadcrumbs.apx, build-options.apx, component-settings.apx, lists.apx, lovs.apx, static-files.apx, application.apx (highlighted), config.json, and page-groups.apx. On the right, the application.apx file is open, showing a JSON configuration for the application. The configuration includes fields for name, advanced settings, authentication, session state protection, database session, app format masks, logo, progressive web app, navigation, and navigation menu.

```
1 app SERVER-CAPABILITY-EXPLORER (
2   name: Server Capability Explorer
3   advanced {
4     allowFeedback: true
5   }
6   authentication {
7     authenticationScheme: @oracle-apex-accounts
8   }
9   sessionStateProtection {
10    bookmarkHashFunction: sha2-512bit
11    checksumSalt: F3FF1F791E5352B0C3832ED228CEE7460995403BBA427A30CAF3ADD6E56AE33
12  }
13  databaseSession {
14    parsingSchema: ANDRDOBR
15  }
16  appFormatMasks {
17    date: DS
18    timestamp: DS
19    timestampTimeZone: DS
20  }
21  logo {
22    text: Server Capability Explorer
23  }
24  progressiveWebApp {
25    enable: false
26  }
27  nav {
28    homeUrl: f?p=&APP_ID.:1:&APP_SESSION.::&DEBUG.:::
29    loginUrl: f?p=&APP_ID.:LOGIN:&APP_SESSION.::&DEBUG.:::
30  }
31  navMenu {
32    listTemplate: @/side-navigation-menu
33    templateOptions: [
34      #DEFAULT#
35      t-TreeNav--styleA
36      js-navCollapsed--hidden
37    ]
38    list: @navigation-menu
39  }
40  navBar {
41    list: @navigation-bar
42    listTemplate: @/navigation-bar
43    templateOptions: #DEFAULT#
44  }
```



# APEXlang: Page Definition

But did you know that you can represent the same view in your favourite IDE?

This might look familiar ... it's the Page Designer View

```
1 page 9999 (  
2   name: Login Page  
3   alias: LOGIN  
4   title: Server Capability Explorer - Log In  
5   appearance {  
6     pageTemplate: @/login  
7     templateOptions: #DEFAULT#  
8   }  
9   nav {  
10    warnOnUnsavedChanges: false  
11  }  
12  security {  
13    authentication: public  
14    pageAccessProtection: argumentsMustHaveChecksum  
15    formAutoComplete: false  
16  }  
17  
18  region server-capability-explorer (  
19    name: Server Capability Explorer  
20    type: staticContent  
21    layout {  
22      sequence: 10  
23      slot: BODY  
24    }  
25    appearance {  
26      template: @/login  
27      templateOptions: #DEFAULT#  
28    }  
29    image {  
30      fileUrl: #APP_FILES#icons/app-icon-512.png  
31    }  
32  )
```



# DEMO

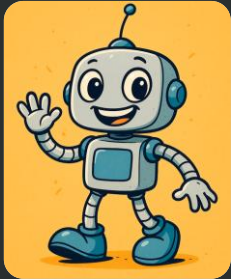


# APEXlang and AI

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**Are you working with AI  
already?**

# Evolution of AI



## Ask AI

Based on **user input**:

- Answer questions
- Complete tasks
- Reactive, user prompt dependent



## Agentic AI

AI agents **work autonomously** to

- Achieve complex goals
- Proactive, goal-oriented action

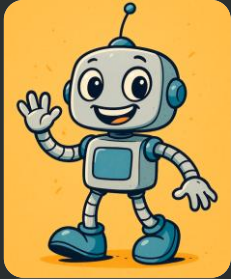


## LLM vs Agents

Large Language Models are sophisticated AI trained on massive amounts of data. They **must be prompted**.

Agent can perceive its environment, **make decisions**, and **take actions** to achieve specific goals

# AI Systems



## Ask AI

Examples include ChatGPT, Gemini, Perplexity, DeepSeek, others.



## Agentic AI

Examples include Codex, **Copilot**, Claude, Windsurf, Cline, Roo Code



## Large Language Models

LLMs really start to make sense when **combined with agents**. Only then they can start to be productive

**Would you like a personal assistant...?**



# Meet Codex

**EXTENSIONS: MARKETPLACE**

codex

- Codex – OpenAI's coding agent** 731ms  
Codex is a coding agent that works with you everywhere ...  
OpenAI
- Codex** 76K ⭐ 5  
Codex gives new meaning to your codebase  
Codex  
Install
- Codex** 6K  
Codex is a collection of Visual Studio Code extensions  
Laczik Dávid  
Install
- CodeX** 2K  
A simple minimalistic dark theme for VSCode. It's also go...  
WorriedArrow  
Install
- Codex-AI** 4K ⭐ 5  
An AI code completion assistant powered by Gemini. Off...  
Mohammed Abdul Raffay  
Install
- Codex Effect** 6K ⭐ 5  
A dark sci-fi color theme inspired by Mass Effect  
steamforge  
Install
- Codex Switch** 1K ⭐ 5  
Switch and manage multiple Codex accounts  
WoozyMasta  
Install
- Codex UI** 1K  
Use Codex CLI (app-server) inside VS Code: sessions, chat...  
harukary7518  
Install
- Ollama Codex** 251  
Local AI Copilot for VSCode using Ollama models  
Parth Kansara  
Install

**Extension: Codex – OpenAI's coding agent**

**Codex – OpenAI's coding agent**  
OpenAI | openai.com | 6,842,558 | ⭐⭐⭐⭐☆ (328)  
Codex is a coding agent that works with you everywhere you code — included in ChatGPT Plus, Pro, Business, Edu, and Enterprise plans.

Switch to Pre-Release Version | Disable | Uninstall | Auto Update

Extension is enabled on 'SSH: [redacted]'

**DETAILS** FEATURES

Codex is OpenAI's coding agent that helps you write, review, and ship code faster. Use it side-by-side in your IDE or delegate larger tasks to the cloud.

### Pair with Codex

Add Codex as a panel in VS Code to chat, edit, and preview changes seamlessly. With context from opened files and selected code, you can write shorter prompts and get faster, more relevant results. (Tip: many users like moving the Codex panel to the right side of the editor.)

### Delegate to Codex in the cloud

Offload bigger jobs to Codex in the cloud, then track progress and review results without leaving your IDE. For finishing touches, open cloud tasks locally. Codex keeps the context consistent.

### Sign in with your ChatGPT account

Codex works with Plus, Pro, Business, Edu, and Enterprise ChatGPT plans. Learn what's included in your plan at the Help Center.

### Learn more about Codex

See the docs at <https://developers.openai.com/codex/ide>.

**Installation**

Identifier	openai.chatgpt
Version	26.406.31014
Last Updated	9 hours ago
Size	261.31MB

**Marketplace**

Published	1 year ago
Last Released	18 hours ago

**Categories**

AI Chat

**Resources**

- License
- OpenAI
- Marketplace



# Codex - Configuration

Codex Settings X

- General
- Configuration**
- Personalization
- MCP servers
- Plugins

### Configuration

Configure approval policy and sandbox settings [Learn more](#)

#### Custom config.toml settings

config.toml  
Edit your config to customize agent behavior  
Restart Codex after editing to apply changes [Docs](#)

**Open config.toml**

Open source licenses  
Third-party notices for bundled dependencies [View](#)

```
[mcp_servers.sqlcl]  
command = "C:/.../sqlcl/bin"  
args = ["-mcp"]
```





# Say hello to the Model Context Protocol

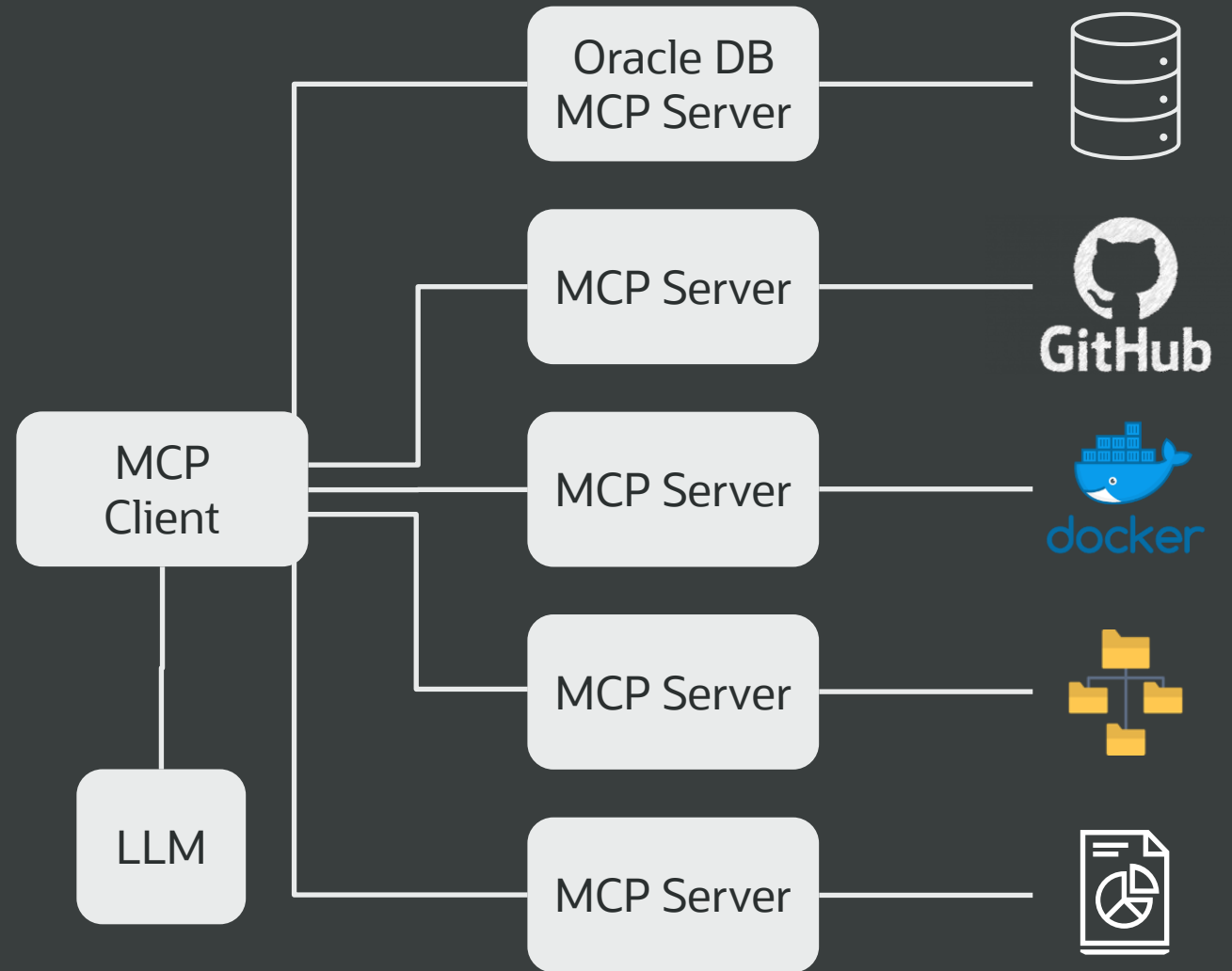
Today: Agentic AI and your Oracle Database are connected via the MCP

# Model Context Protocol

Launched Nov 2024 by Anthropic

- Marketed as “USB-C for AI applications”.
- Singular interface to standard interactions with database, files, business apps, developer tools...
- Simplification hides the complexity of the Server implementation.

Refer to [modelcontextprotocol.io](https://modelcontextprotocol.io) for an introduction.



# What does an MCP Server provide?

# MCP Server

Resource

Tools

Prompt

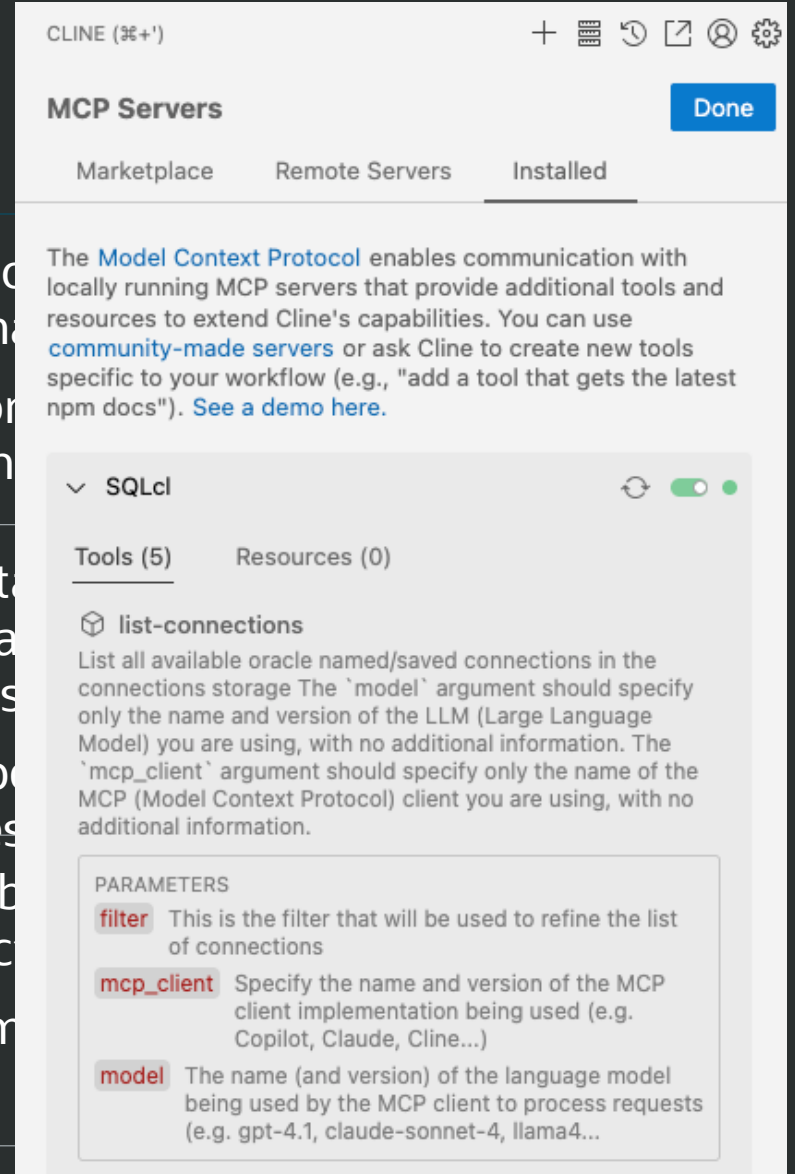
Data source  
information  
File connector  
response

Executing  
application  
actions

File operations  
queries

Reusable  
interactions

System



# LLM-Agent-MCP Server-Database Flow

## 1. Tool Discovery

Server responds with available tools (name, schema, metadata)

## 2. Tool Selection by Model

LLM chooses the tool based on user intent. Client receives selection and prepares tool call

## 3. Tool Invocation

Server executes tool and returns result (text, images, structured data)

## 4. Result Handling

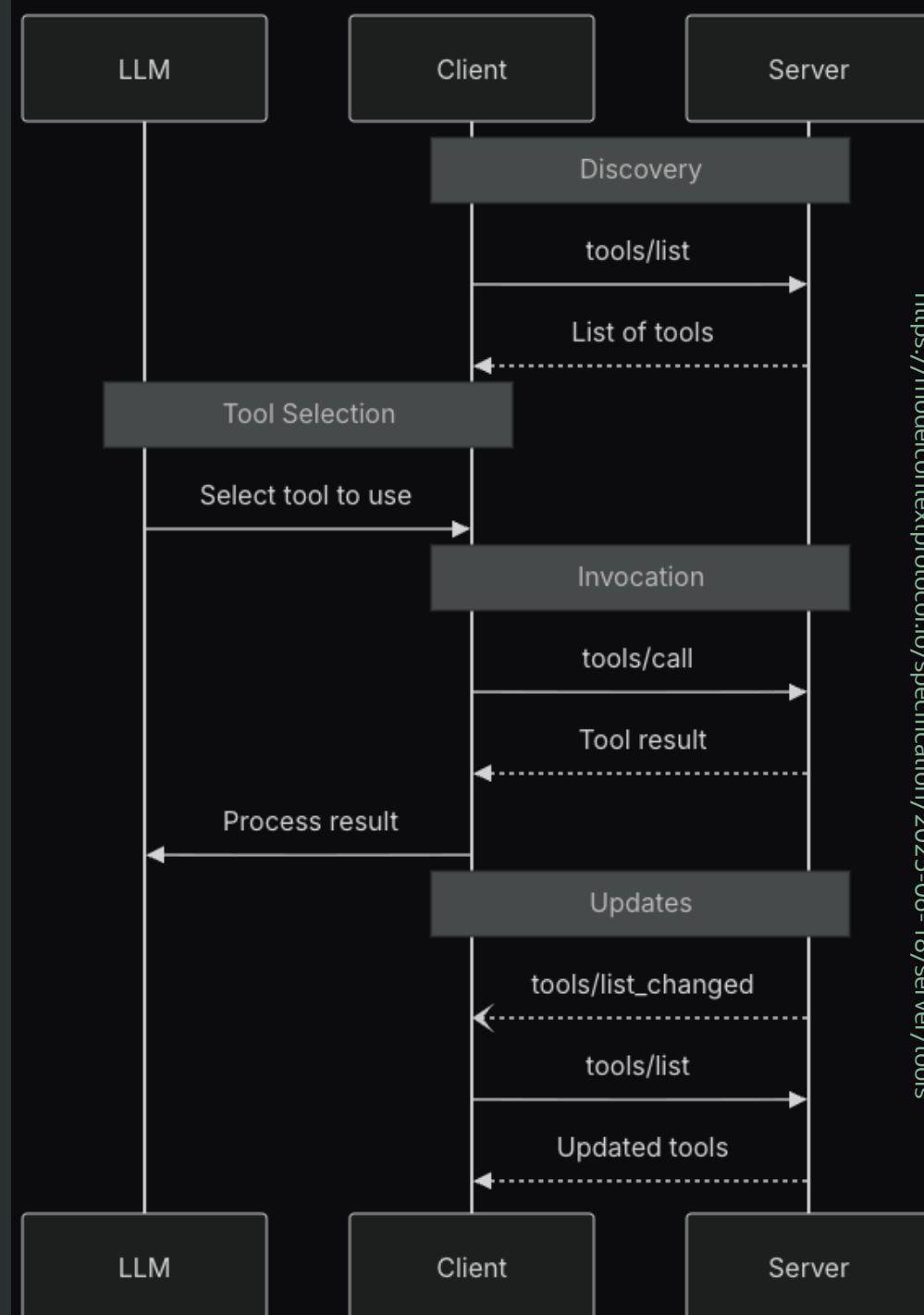
Client forwards tool response to LLM. LLM continues conversation using tool output

## 5. Dynamic Tool Updates (Optional)

Client re-fetches updated list via tools/list

## Summary

Enables dynamic, modular, and structured tool use in AI interactions.



<https://modelcontextprotocol.io/specification/2025-06-18/server/tools>

# Introducing Oracle Database's MCP Server

Available for:

- any edition, including FREE
- *any version* (19, 21, 23)
- any deployment (on-premises, Cloud, containers, etc.)

Provides Oracle Database access to agents

- List connections
- Connect to the database
- Run queries, scripts, or commands

The MCP Server runs locally.

```
SQLcl: Release 25.2 Production on Tue Jul 22 10:35:35
2025

Copyright (c) 1982, 2025, Oracle. All rights reserved

Connected to:
Oracle Database 23ai Free Release 23.0.0.0.0 - Develop,
Learn, and Run for Free
Version 23.5.0.24.07
SQL> cm list

.
├── Cloud
│   └── [0] Autonomous Reporting
└── Local
    ├── Project Payroll $
    └── Project Raptor 🦇

SQL>

viins | 1:0 | HR | Project Raptor 🦇
```



# SQLcl: a modern command line interface

Awesome  
CI/CD commands  
included

ALIAS	<b>APEX</b>	AQ	ARBORI	AWR	BACKGROUND	BLOCKCHAIN_ TABLE	BRIDGE
CD	CERTIFICATE	CLOUDSTORAGE	CODESCAN	CONNMGR	COPY	CS	CTAS
DATAPUMP	DBCCRED	DDL	DG	DIRS	FIND	FORMAT	HISTORY
IMMUTABLE_ TABLE	INFORMATION	JOBS	<b>LIQUIBASE</b>	LOAD	MDB	MIGRATEADVISOR	MLE
MODELER	NET	OCI	OCIDBMETRICS	OERR	ORAPKI	POPD	<b>PROJECT</b>
PUSHD	RCV	REPEAT	REST	SCRIPT	SDK	SECRET	SODA
SSHTUNNEL	TNSPING	TOSUB	UNLOAD	VAULT	WAIT4	WHICH	

# DEMO



# APEXlang in the CI/CD context

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# What does it mean CI/CD?

Commonly includes:

- builds
- tests
- deployments
- (sometimes) infrastructure automation

## Continuous Integration

Developers integrate code frequently.

## Infrastructure as Code

Infrastructure is defined and versioned just like application code.

## Continuous Delivery

Software is always in a **deployable state**.

Pipeline example:

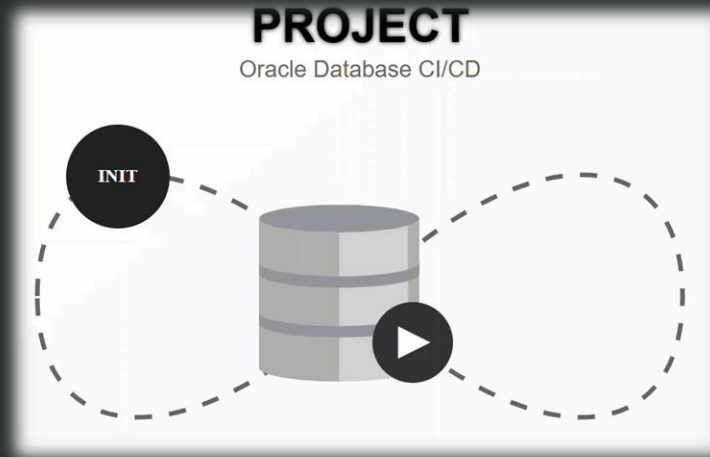
Code → Build → Test → Package → Deploy

## Continuous Integration

Developers integrate code frequently.

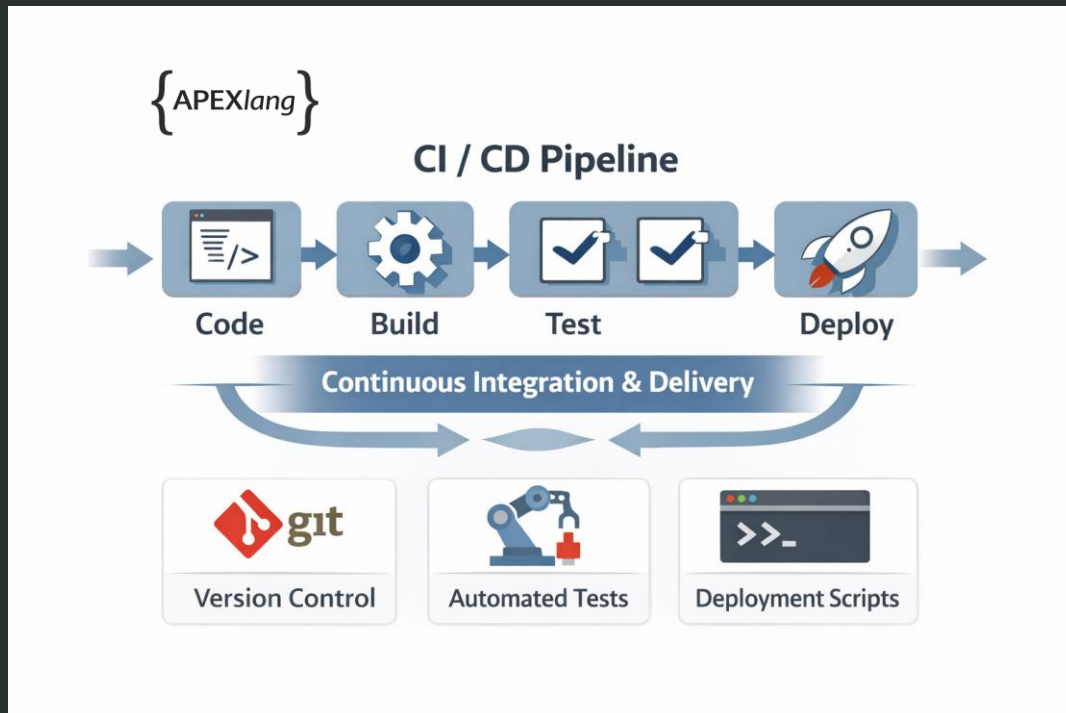
Typical workflow:

Code commit → automated build → automated tests



**Main Goal is ship quality software faster through automation.**

# Continuous Integration/Continuous Delivery (Deployment)



## APEXlang

- Human-readable format
- Diffable and reviewable
- Git-friendly

## APEXlang in CI/CD

- Works with SQLcl
- Version control
- Automated builds and deployments

## APEX becomes pipeline ready

## Git

- manages code history

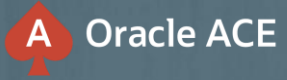
## GitHub

- stores repository
- triggers pipelines



# DEMO





# Tech Superstars Unite

Get worldwide recognition as an Oracle ACE



Oracle.com profile page



Swag, certification exam credit & event passes



Exclusive content



Networking events



Your own Oracle cloud account



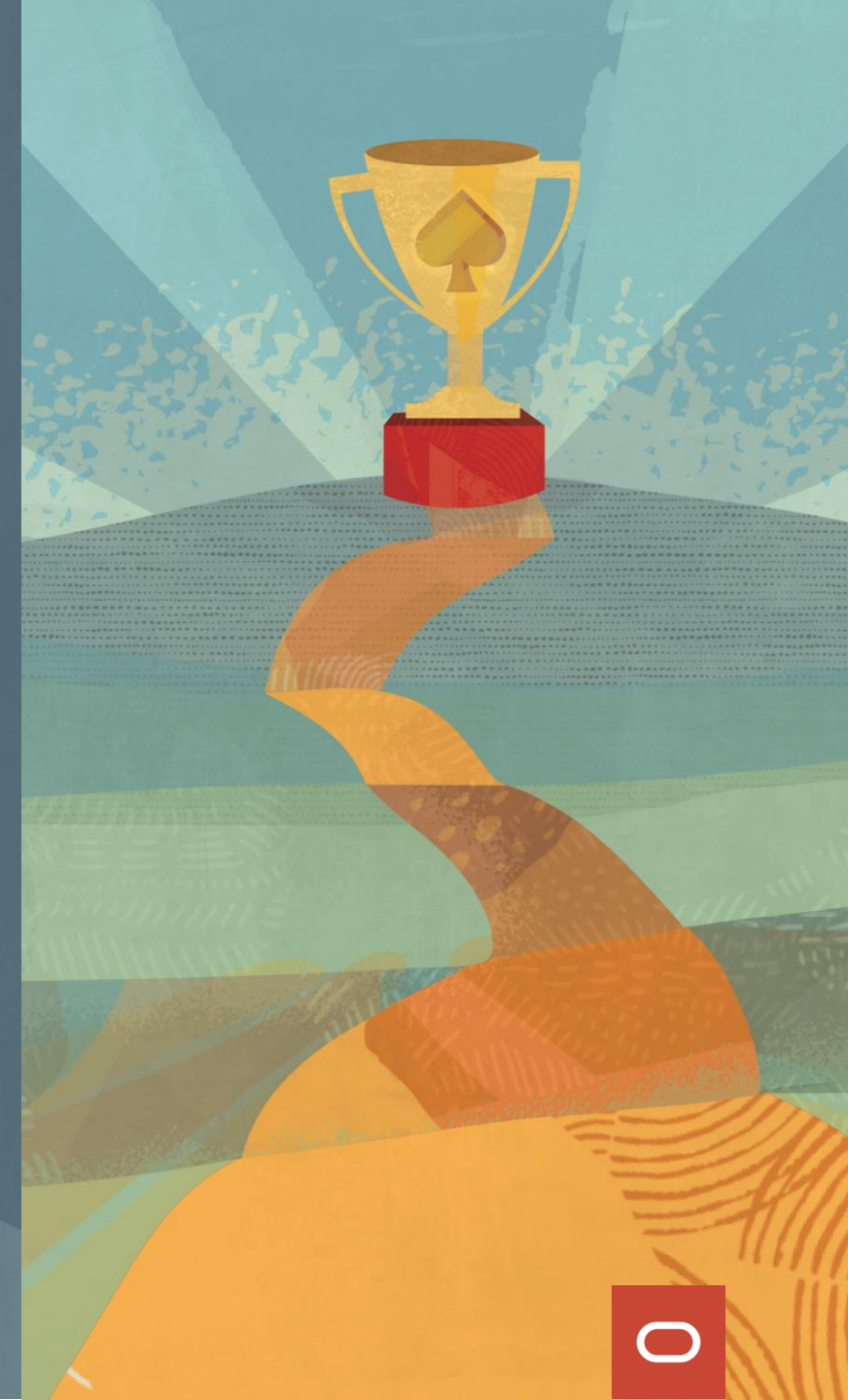
Travel support

✕ @oracleace

📌 [Linkedin.com/groups/1796302](https://www.linkedin.com/groups/1796302)

🦋 @oracleace.bsky.social

Learn more at:  
[ace.oracle.com](https://ace.oracle.com)





# Thank you

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