1 Introduction

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About

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Oracle Database 23ai is the next long-term support release of Oracle Database. It includes over 300 new features with a focus on artificial intelligence (AI) and developer productivity. Features such as AI Vector Search enable you to leverage a new generation of AI models to generate and store vectors of documents, images, sound, and so on; index them and quickly look for similarity while leveraging the existing analytical capabilities of Oracle Database. This combined with the already extensive set of Machine Learning algorithms enables you to quickly create sophisticated AI-enabled applications. Oracle Database 23ai also uses AI to optimize many of the key database functions to make more accurate estimates on timings and resource costings.

New developer-focused features now make it simpler to build next-generation applications that use JSON or relational development approaches or both interchangeably. New microservice and messaging functionality improves upon Oracle Database's extensive support for this key design methodology. If you need to distribute or shard your database because of regulatory or performance requirements, Oracle Database 23ai adds new RAFT protocol support to make it easier than ever before.

Oracle Database 23ai also includes significant improvements to SQL and PL/SQL, introducing new data types and language enhancements to create new or improve existing OLTP or analytical applications. While Oracle Database is widely regarded as the most secure database in the industry, many new capabilities such as SQL Firewall enable you to control exactly what SQL is executed against your database.

To help DBAs, Oracle Database 23ai further refines many of the key management tasks, reducing their complexity and improving their performance as well as introducing new functionality to simplify tasks, such as reclaiming free space in tablespaces. Oracle Database also adds new performance improvements both at an infrastructural level (with technologies like True Cache) and at the SQL level, ensuring some statements will execute many times faster.

Note: For information about desupported features, see Oracle Database Changes, Desupports, and Deprecations.

Feature Highlights

AI Vector Search

Oracle AI Vector Search is designed for Artificial Intelligence (AI) workloads and allows you to query data based on semantics, rather than keywords.

See Oracle AI Vector Search User's Guide.

JSON Relational Duality

Data can be transparently accessed and updated as either JSON documents or relational tables.

Developers benefit from the strengths of both, which are simpler and more powerful than Object Relational Mapping (ORM).

See JSON-Relational Duality.

Operational Property Graphs in SQL

Developers can now build real-time graph analysis applications against operational data directly in the Oracle Database, utilizing its industry leading security, high availability and performance capabilities.

See Support for the ISO/IEC SQL Property Graph Queries (SQL/PGQ) Standard.

Microservice Support

Alongside Oracle's already comprehensive support for microservices, new functionality makes it simpler to implement cross-service transactions.

See Microservices.

Lock-Free Reservations

Lock-free column value reservations allow applications to reserve part of a value in a column without locking the row; for example, reserve part of a bank account balance

or reserve an item in inventory without locking out all other operations on the bank account or item.

See Lock-Free Reservations.

Kafka APIs for TxEventQ

Kafka applications can now run directly against the Oracle Database with minimal code changes, leveraging high performance Transaction Event Queues (TxEventQ).

See Kafka APIs for TxEventQ.

JavaScript Stored Procedures

Developers can now create stored procedures using JavaScript in the database. This functionality also allows developers to leverage the huge number of JavaScript libraries.

See JavaScript.

Priority Transactions

Low priority transactions that block high priority transactions can be automatically aborted. This feature reduces the administrative burden on the DBA while maintaining high transaction throughput.

See Priority Transactions.

Data Use Case Domains

Data Use Case Domains allow developers to declare the intended usage of data (columns) in a centralized and light-weight manner. For example, you can declare a column to hold an email, URL, password, currency, and so on. Applications can use Data Use Case Domains to automatically generate code or verify values.

See Data Use Case Domains.

Many Data Type and SQL Enhancements

The following are among the many data type and SQL enhancements:

- SQL BOOLEAN Data Type
- Direct Joins for UPDATE and DELETE Statements

- Unicode 15.0 Support
- SELECT Without FROM Clause
- GROUP BY Column Alias or Position

Up to 4096 Columns per Table

Database tables now support up to 4096 columns. This feature simplifies the development of applications needing large numbers of attributes, such as ML and IoT.

See Wide Tables.

Improved Machine Learning Algorithms

New improvements to Oracle In-Database Machine Learning algorithms make it simpler to categorize text and data while offering better performance and flexibility.

See Machine Learning - Enhancements.

Sharding Enhancements

New functionality makes it simpler to create and manage shard replicas. New sharding models also improve the distribution of data for shard keys with few unique values.

See Oracle Globally Distributed Database Raft Replication.

Schema Privileges

System privileges can now be granted at the schema level. This feature simplifies the privilege management process and as a result, makes it easy to secure databases.

See Schema Privileges to Simplify Access Control.

Developer Role

A new role allows administrators to quickly assign developers only the privileges they need to design, build, and deploy applications for the Oracle Database.

See New Database Role for Application Developers.

SQL Firewall

Included in Oracle Database, SQL Firewall provides real-time protection against common database attacks by monitoring and blocking unauthorized SQL and SQL injection attacks, no matter the SQL execution path.

See Oracle SQL Firewall Included in Oracle Database.

Azure AD OAuth2 Integration

New functionality enables single sign-on to Oracle Database service instances or on-premises Oracle Databases from Microsoft Azure Cloud.

See JDBC Support for OAuth 2.0 Including OCI IAM and Azure AD.