



# Oracle AI Database: New Features for Administrators

Student Guide  
S1106063GC10



**Copyright © 2025, Oracle and/or its affiliates.**

## **Disclaimer**

This document contains proprietary information and is protected by copyright and other intellectual property laws. The document may not be modified or altered in any way. Except where your use constitutes "fair use" under copyright law, you may not use, share, download, upload, copy, print, display, perform, reproduce, publish, license, post, transmit, or distribute this document in whole or in part without the express authorization of Oracle.

The information contained in this document is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

## **Restricted Rights Notice**

If this documentation is delivered to the United States Government or anyone using the documentation on behalf of the United States Government, the following notice is applicable:

U.S. GOVERNMENT END USERS: Oracle programs (including any operating system, integrated software, any programs embedded, installed or activated on delivered hardware, and modifications of such programs) and Oracle computer documentation or other Oracle data delivered to or accessed by U.S. Government end users are "commercial computer software" or "commercial computer software documentation" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, reproduction, duplication, release, display, disclosure, modification, preparation of derivative works, and/or adaptation of i) Oracle programs (including any operating system, integrated software, any programs embedded, installed or activated on delivered hardware, and modifications of such programs), ii) Oracle computer documentation and/or iii) other Oracle data, is subject to the rights and limitations specified in the license contained in the applicable contract. The terms governing the U.S. Government's use of Oracle cloud services are defined by the applicable contract for such services. No other rights are granted to the U.S. Government.

## **Trademark Notice**

Oracle®, Java, MySQL, and NetSuite are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Inside are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Epyc, and the AMD logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group.

## **Third-Party Content, Products, and Services Disclaimer**

This documentation may provide access to or information about content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Oracle. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Oracle.

1010302025

# Contents

## ----- Important Note -----

**Oracle AI Database 26ai** has replaced **Oracle Database 23ai**. This change was announced at Oracle AI World in October 2025. The architecture, concepts, and features presented in this course remain fully relevant to 26ai.

### I Course Overview

- Presenters 1-2
- Prerequisites 1-4
- Learning Outcome 1-5
- Course Objectives 1-6

### 1 Oracle AI Vector Search

- Objectives 1-2
- Oracle AI Vector Search Benefits 1-3
- Benefits of Oracle AI Vector Search 1-4
- VECTOR Data Type 1-5
- Examples 1-7
- The Complete Workflow 1-8
- Vector Embeddings 1-9
- Vector Embedding Models 1-11
- Import Embedding Models 1-13
- Basic Queries and Similarity Search 1-14
- Basic Queries 1-15
- Basic Queries: Comparison Operations 1-17
- Similarity Search 1-18
- Exact Similarity Search 1-19
- Vector Distance Metrics 1-20
- Vector Distance Metric Example: Exact Similarity Search 1-21
- Euclidean Metric 1-22
- Euclidean Squared Distance Metric Example 1-23
- Approximate Similarity Search 1-24
- Approximate Similarity Search or Exact Similarity Search? 1-25
- Approximate Similarity Search 1-26
- Approximate Similarity Search: HNSW 1-27
- Approximate Similarity Search: IVF 1-28

### 2 True Cache

- Objectives 2-2
- About True Cache 2-4
- True Cache Benefits 2-6

True Cache: High-Level View	2-7
True Cache: Good to Know	2-8
True Cache Application Usage	2-9
Concurrency Control	2-10
Configuring and Deploying True Cache	2-11
Configuring True Cache Overview	2-12
Uniform Configuration	2-14
Partition Configuration COLOCATION_TAG	2-16
Partition Configuration Multiple Services	2-18
True Cache Configuration Process Overview	2-20
True Cache Best Practices	2-21
Best Practices for Maximum Availability Architecture (MAA)	2-22
Configuring and Deploying True Cache: With DBCA	2-23
DBCA Prerequisites	2-24
Configuring True Cache with DBCA	2-25
Configuring True Cache Database Application Services	2-28
Configuring and Deploying True Cache: Manually	2-35
Manually Configuring True Cache: Prerequisites	2-36
Manually Configuring True Cache: Simplified Steps	2-37
Configuring Oracle True Cache: tnsnames.ora	2-39
Configuring Oracle True Cache: tnanames.ora	2-42
Configuring Oracle True Cache: Local Listener	2-43
Configuring Oracle True Cache: Password File	2-45
Configuring Oracle True Cache: Prepare PFILE	2-46
Configuring Oracle True Cache: Initial True Cache Startup	2-51
Configuring Oracle True Cache: Create True Cache Database Instance	2-52
Configuring and Deploying True Cache: Application Services	2-53
Configuring True Cache Database Application Services	2-54
Creating Database Application Services on the Primary Database	2-55
Verifying Database Application Services Are Created	2-57
Starting Corresponding Database Application Services	2-58
Configuring and Deploying True Cache: RAC Primary Database	2-62
Deploying True Cache for an Oracle RAC Primary Database	2-63
Configuring and Deploying True Cache: Verify Configuration	2-65
Configuring Oracle True Cache: Verify Status	2-66
Configuring Oracle True Cache: Verify Listener	2-67
Configuring Oracle True Cache: Verify Application Services	2-68
Configuring and Deploying True Cache: Enable DML Redirection	2-69
Configuring Oracle True Cache: Enable DML Redirection	2-70
Configuring and Deploying True Cache: Deploy in Containers	2-71
Deploying True Cache in Containers	2-72

- Managing True Cache: Shutdown and Start 2-73
- Shutting Down and Starting True Cache 2-74
- Managing True Cache: Deleting True Cache 2-75
- Deleting True Cache: DBCA 2-76
- Deleting True Cache: Manually 2-77
- Monitoring True Cache 2-79
- Monitoring True Cache: V\$TRUE\_CACHE View 2-80
- Monitoring True Cache: V\$TRUE\_CACHE View Columns 2-81
- Monitoring True Cache: Automatic Workload Repository 2-83
- Using Oracle True Cache in Your Applications 2-87
- True Cache Application: JDBC 2-89
- Best Practices for Load Balancing in a Uniform Configuration 2-91
- Complementary Caching Features 2-94
- Test Application 2-95
- Summary 2-96

### **3 Sharding New Features**

- Objectives 3-2
- Database Sharding 3-4
- Oracle Database Sharding 3-6
- Oracle Database 23ai Sharding New Features 3-24
- Sharding Native Replication (RAFT-Based) 3-26
- Directory-Based Sharding 3-31
- Coordinated Backup and Restore for Sharded Databases 3-39
- Centralized Backup Recovery 3-44
- Automatic Bulk Data Move on Sharding Key Update 3-46
- Split/Move of a Partitionset with Bulk Data Movement 3-52
- Summary 3-57

### **4 Automatic SQL Plan Management**

- Objectives 4-2
- Automatic SQL Plan Management: Overview 4-3
- SPM Evolve Advisor 4-4
- Benefits 4-6
- Problems It Solves 4-7
- When to Use 4-8
- How to Use It 4-9
- Summary 4-10

## **5 Automatic Transaction Rollback**

- Objectives 5-2
- Overview 5-3
- Using Automatic Transaction Rollback 5-4
- Automatic Transaction Rollback 5-8
- Using Automatic Transaction Rollback 5-9
- Monitoring 5-14
- Benefits 5-17
- Summary 5-18

## **6 Automatic Transaction Quarantine**

- Objectives 6-2
- Overview 6-3
- Automatic Transaction Quarantine: Workflow 6-5
- Monitoring Quarantined Transactions 6-6
- Resolving Quarantined Transactions 6-9
- Resolving Quarantined Transactions Examples 6-10
- Resolving Quarantined Transactions: Examples 6-11
- Dropping Quarantined Transactions 6-12
- Quarantined Transaction Escalation 6-13
- Summary 6-15

## **7 Flashback Log Placement**

- Objectives 7-2
- Flashback Log Overview 7-3
- Flashback Log Parameters 7-4
- Flashback Log Management 7-7
- Summary 7-8

## **8 Simplified Database Migration Across Platforms Using RMAN Backups**

- Objectives 8-2
- Overview 8-3
- Methods of Transporting with Recovery Catalog 8-6
- Methods of Transporting in NOCATALOG Mode 8-7
- Methods of Transporting Over Network Link 8-8
- Prerequisites Generic 8-9
- Prerequisites Specific 8-10
- Recovery Catalog Methods for PDBs 8-13
- Quickly Transport a PDB with Recovery Catalog 8-16
- Transport a PDB by Using a Pre-existing Backup with Recovery Catalog 8-22
- Transport a PDB Using Multiple Incremental Backups with Recovery Catalog 8-27

Recovery Catalog Methods for Tablespaces	8-29
Recovery Catalog Method for Tablespaces	8-30
Quickly Transport a Tablespace with Recovery Catalog	8-32
Transport a Tablespace by Using a Pre-existing Backup with Recovery Catalog	8-37
Transport a Tablespace Using Multiple Incremental Backups with Recovery Catalog	8-42
Transport a PDB Using Multiple Incremental Backups with Recovery Catalog	8-49
Methods of Transporting in NOCATALOG Mode	8-51
NOCATALOG Mode for PDBs	8-52
Quickly Transport a PDB NOCATLOG	8-54
Transport a PDB Using a Pre-existing Backup NOCATLOG	8-58
Transport a PDB Using Multiple Incremental Backups NOCATLOG	8-62
NOCATALOG Mode for Tablespaces	8-72
Quickly Transport a Tablespace NOCATALOG	8-73
Transport a Tablespace by Using a Pre-existing Backup NOCATALOG	8-76
Transport a Tablespace Using Multiple Incremental Backups NOCATALOG	8-80
Methods of Transporting Over Network Link	8-89
Transporting PDBs Over Network Link	8-91
Quickly Transport a PDB Over Network Link	8-92
Transporting PDBs by Restoring Backups Incrementally Over the Network	8-96
Methods of Transporting Over Network Link	8-104
Transporting Tablespaces Over Network Link	8-105
Quickly Transport a Tablespace Over Network Link	8-106
Transporting Tablespaces by Restoring Backups Incrementally Over the Network	8-110
Summary	8-118

## **9 Lock-Free Reservations**

Objectives	9-2
Optimistic vs Lock Free	9-3
Optimistic Approach	9-4
Lock-Free Approach	9-5
Frequently Modified Values	9-6
Lock-Free Reservations	9-7
Lock-Free Reservation Features	9-9
Lock-Free Reservation Benefits	9-10
Functionality Requirements	9-11
Create, Modify, Delete	9-14
Lock-Free Journal Table	9-17
Journal Table Restrictions	9-18

Lock-Free Reservations 9-19  
Views 9-20  
Summary 9-23

## **10 Wide Columns**

Objectives 10-2  
Prior Challenges 10-3  
Benefits 10-4  
Increase Column Limits 10-5  
Performance 10-6  
Summary 10-7

## **11 Improved Performance Hybrid Columnar Compression (HCC)**

Objectives 11-2  
HCC Pre 23ai 11-3  
HCC in 23ai 11-7  
Database Compatibility 11-8  
Performance 11-9  
Summary 11-10

## **12 Unrestricted Parallel DMLs**

Objectives 12-2  
Overview Parallel DML 12-3  
23ai Parallel DML Improvements 12-5  
Benefits 12-9  
Summary 12-10

## **13 Unrestricted Direct Loads**

Objectives 13-2  
Direct Loads Pre 23ai 13-3  
Direct Loads 23ai 13-6  
Benefits 13-9  
Summary 13-10

## **14 Accelerate SecureFiles LOB Write Performance**

Objectives 14-2  
Overview 14-3  
Benefits 14-4  
Summary 14-5



## **15 Fast Inserts Enhancements**

- Objectives 15-2
- Fast Ingest Overview (aka Deferred Inserts) 15-3
- Fast Ingest Overview 15-5
- Using Fast Ingest 15-7
- Enhancements 15-11
- Benefits 15-12
- Management 15-13
- Summary 15-17

## **16 Blockchain Tables**

- Objectives 16-2
- Blockchain Table Overview 16-4
- Blockchain Table Row Versions 16-17
- Blockchain Table User Chains 16-20
- Blockchain Table Delegate Signer 16-24
- Blockchain Table Countersignature 16-29
- Summary 16-32

## **17 Security New Features**

- Objectives 17-2
- Database Security 17-4
- Pluggable Database Hybrid Read-Only Mode 17-15
- Read-Only User and Session 17-24
- New Developer Role 17-35
- Simplified Schema Privileges 17-44
- Simplified Schema Privileges: Example 17-54
- Audit Object Actions at the Column Level 17-56
- Ability to Control Authorizations for Unified Auditing with Database Vault 17-65
- Integration of Microsoft Azure Active Directory with Additional Oracle Database Environments 17-69
- Summary 17-73

## **18 Data Storage Improvements**

- Objectives 18-2
- SecureFiles 18-4
- Traditional SecureFiles Shrinking 18-5
- Automatic SecureFiles Shrinking: Advantages 18-6
- High-Level View 18-7
- Controlling Automatic SecureFiles Shrink 18-8
- Automatic Storage Compression 18-9

Automatic Storage Compression and Automatic Clustering 18-10  
Automatic Storage Compression: Advantages 18-11  
Controlling Automatic Storage Compression 18-12  
Summary 18-13

## **19 Time and Date Handling Changes**

Objectives 19-2  
Enhanced Time Zone Data Upgrade 19-3  
Time Zone Definitions Change: Considerations 19-4  
Optimizing Time Zone File Upgrade 19-5  
Benefits of Enhanced Time Zone Update 19-6  
Tables with TIMESTAMP WITH TIME ZONE Data 19-7  
New Parameter in the init.ora File 19-8  
Configuring Database Parameters 19-9  
SYSDATE and SYSTIMESTAMP 19-10  
Date and Time in Oracle Databases 19-11  
Database Time Versus OS System Time 19-12  
Database-Specific Time in Oracle Database 23ai 19-13  
Setting Database-Specific Time: Example 19-14  
Summary 19-15