

# Oracle® GoldenGate

## Release Notes



23ai  
F70300-05  
June 2024



Oracle GoldenGate Release Notes, 23ai

F70300-05

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# Preface

This document describes the new features, major changes, and known issues for this release of Oracle GoldenGate.

## Documentation Accessibility

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### Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

## Conventions

The following text conventions are used in this document:

Convention	Meaning
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, such as "From the File menu, select <b>Save</b> ." Boldface also is used for terms defined in text or in the glossary.
<i>italic</i> <i>italic</i>	Italic type indicates placeholder variables for which you supply particular values, such as in the parameter statement: <code>TABLE <i>table_name</i></code> . Italic type also is used for book titles and emphasis.
monospace MONOSPACE	Monospace type indicates code components such as user exits and scripts; the names of files and database objects; URL paths; and input and output text that appears on the screen. Uppercase monospace type is generally used to represent the names of Oracle GoldenGate parameters, commands, and user-configurable functions, as well as SQL commands and keywords.
UPPERCASE	Uppercase in the regular text font indicates the name of a process or utility unless the name is intended to be a specific case. Keywords in upper case (ADD EXTRACT, ADD EXTTRAIL, FORMAT RELEASE).
LOWERCASE	Names of processes to be written in lower case. Examples: ADD EXTRACT <code>exte</code> , ADD EXTTRAIL <code>ea</code> .
{ }	Braces within syntax enclose a set of options that are separated by pipe symbols, one of which must be selected, for example: <code>{<i>option1</i>   <i>option2</i>   <i>option3</i>}</code> .
[ ]	Brackets within syntax indicate an optional element. For example in this syntax, the SAVE clause is optional: <code>CLEANUP REPLICAT <i>group_name</i> [<i>, SAVE count</i>]</code> . Multiple options within an optional element are separated by a pipe symbol, for example: <code>[<i>option1</i>   <i>option2</i>]</code> .

Convention	Meaning
Sample Locations	Compass directions such as east, west, north, south to be used for demonstrating Extract and Replicat locations. Datacenters names to use the standard similar to dc1, dc2.
Group names	Prefixes for each process, as follows: <ul style="list-style-type: none"> <li>• Extract: ext. Usage with location: extn, where <b>n</b> indicates 'north' compass direction.</li> <li>• Replicat: rep. Usage with location: repn, where <b>n</b> indicates 'north' compass direction.</li> <li>• Distribution Path: dp. Usage with location: dpn, where <b>n</b> indicates 'north' compass direction.</li> <li>• Checkpoint table: ggs_checkpointtable</li> <li>• Trail file names: e or d depending on whether the trail file is for the Extract of distribution path. Suffix derived in alphabetical order. Usage for an Extract trail file: ea, eb, ec.</li> <li>• Trail file subdirectory: The name will use compass directions to refer to the trail subdirectories. Example for trail subdirectory name would be /east, /west, /north, /south.</li> </ul>

## Related Information

The Oracle GoldenGate Product Documentation is available from the following location:

[Oracle GoldenGate Documentation](#)

Oracle GoldenGate for Distributed Applications and Analytics

[Oracle GoldenGate for Distributed Applications and Analytics](#)

For OCI GoldenGate, refer to:

[OCI GoldenGate](#)

For details on Oracle Database High Availability, see:

[Oracle Database High Availability](#)

# 1

## Introduction

This chapter introduces the Release Notes for Oracle GoldenGate.

### Topics:

## Latest Release Information

This document is accurate at the time of publication. Oracle will update the release notes periodically after the software release. You can access the latest information and additions to these release notes on the Oracle Technology Network at:

<http://www.oracle.com/technetwork/indexes/documentation/index.html>

## Purpose of this Document

This document contains the release information for Oracle GoldenGate.

Oracle recommends that you review its contents before installing, or working with the product.

## Certification Information

To see versions of platforms and related software for which Oracle GoldenGate is certified and supported, go to <https://www.oracle.com/integration/goldengate/certifications/>

## Product Documentation

For complete documentation on Oracle GoldenGate, go to <https://docs.oracle.com/en/middleware/goldengate/core/index.html>.

## Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support at <https://support.oracle.com>

[Lifetime Support Policy for Oracle GoldenGate](#)

## Licensing Information

Detailed information regarding license compliance for Oracle GoldenGate is available here:

[Licensing Information](#) in the *Oracle GoldenGate Licensing Information* guide.

# 2

## New Features

This section highlights new features available with the current release of Oracle GoldenGate.

### Release 23ai (23.4.2): June 2024

#### **Oracle GoldenGate 23ai supports direct connectivity (DSN-less) for SQL Server database connections**

Oracle GoldenGate 23ai adds direct connectivity support for SQL Server connections, allowing server host/IP and instance port entries for database connections.

For more information see, [Add Database Connections](#).

### Release 23ai (23.4.1): June 2024

#### **Oracle GoldenGate 23ai for Teradata supports Microservices Architecture**

Oracle GoldenGate 23ai for Teradata now supports Microservices Architecture.

For more information, see the Installation Requirements for Teradata and Configure Teradata topics in the *Oracle GoldenGate Microservices Architecture Documentation for 23ai*.

### Release 23ai: May 2024

#### **Oracle GoldenGate support for database artificial intelligence (AI)**

Oracle GoldenGate 23ai adds artificial intelligence support with the following data types:

- Oracle Database 23ai uses the new `vector` data type to store vector embeddings, which are mathematical vector representations of data. Oracle GoldenGate 23ai supports capture and delivery of the `vector` data type for Oracle Database 23ai to enable real-time vector processing for embedding flow. For more information, see Oracle: Details of Support for Oracle Data Types and Objects.
- Oracle GoldenGate 23ai can replicate vector data heterogeneously and homogeneously if the embedding algorithm is same in terms of type and dimension, across the databases, allowing migration of vector data from one database to another.
- Oracle GoldenGate 23ai also supports the capture and delivery of `array`, `pgvector` extension, `tsquery` and `tsvector` for PostgreSQL and most vendor derivatives. For more information, see PostgreSQL: Supported Data Types.

#### **Configuration service to store critical configuration data**

Oracle GoldenGate 23ai now supports a new Configuration Service for managing the configuration files of Oracle GoldenGate for high availability (HA) purposes. For more information, see Configuration Service.



### **Data streaming service**

Oracle GoldenGate 23ai introduces the data streaming service. This service enables simplified access to database change records, provides continuous ETL, and real-time analytics over a web socket connection. For more information, see [About Data Streaming Service](#).

### **Monitor Oracle GoldenGate statistics**

Oracle GoldenGate 23ai supports StatsD, which is an open-source network daemon that listens for statistics, like counters and timers, sent over TCP and sends aggregates to one or more pluggable backend services. Oracle GoldenGate Microservice Architecture sends metrics to the Performance Metrics Service and writes metrics in StatsD format to a StatsD daemon or a time series databases that supports ingestion of StatsD metrics.

For more information, see [Using StatsD with OGG](#)

### **Trail file management**

Oracle GoldenGate 23ai has introduced the ability to manage trail files directly, including the ability to create archive tasks and delete trail files.

For more information, see [Trail File Management](#).

### **Support for new TRANLOGOPTIONS parameter**

Oracle GoldenGate 23ai adds support for the new `TRANLOGOPTIONS EXCLUDEFILTERTABLE` parameter. This parameter replaces the `TRANLOGOPTIONS FILTERTABLE` parameter but supports the same functionality. For more information, see [TRANLOGOPTIONS](#).

### **Support for Db2 version 13 for z/OS**

Oracle GoldenGate 23ai now supports Db2 version 13 for z/OS.

### **Support for new DISTINCT data type**

Oracle GoldenGate 23ai now supports the new `DISTINCT` data type for Db2 for i, Db2 LUW, and Db2 z/OS.

### **New user interface for Oracle GoldenGate Microservices Architecture**

The Oracle GoldenGate Microservices Architecture web interface has been renewed with improved capabilities and enhanced user experience.

### **Oracle GoldenGate 23ai features for Oracle Database 23ai**

- **Oracle GoldenGate supports Lock-free Reservable Columns**  
Lock-free reservable columns are supported with Oracle GoldenGate 23ai. For more information, see [Support for Lock-free Reservation](#).
- **Oracle GoldenGate supports Blockchain and Immutable Tables**  
Blockchain and immutable tables are supported. For more information, see [Tables, Views, and Materialized Views](#).
- **Support for Oracle SQL Domains**  
Oracle GoldenGate supports Oracle SQL Domains. For more information, see [Details of Support for Oracle Data Types and Objects](#).
- **Support for Boolean data type**

Oracle GoldenGate supports Boolean data type. For more information, see Details of Support for Oracle Data Types and Objects.

- **Oracle GoldenGate supports tables with 4K columns for Oracle Database 23ai**

Oracle GoldenGate supports tables with 4K columns for Oracle Database 23ai. For more information, see Tables, Views, and Materialized Views.

- **Support for Oracle database online DDL**

Oracle GoldenGate Extract and Replicat processes can manage replication for DDL operations in cases where minimal supplemental logging is enabled. This provides more flexibility for online application upgrades using Edition Based Redefinition.

For more information, see Using Edition-Based Redefinition section in *Oracle GoldenGate Microservices Documentation*.

- **JSON diff data type is supported with Oracle GoldenGate 23ai**

JSON diff data type is supported with Oracle GoldenGate 23ai. For more information, see Details of Support for Oracle Data Types and Objects.

- **Oracle GoldenGate 23ai works with per-PDB Extract level users only**

Oracle GoldenGate 23ai captures using per-PDB Extract only. Root level access using common user (`c##ggadmin`) is not available.

For more information, see Configure Multitenant Container Database.

- **Support for VECTOR data type**

Oracle GoldenGate 23ai now supports VECTOR data type to store vector embeddings.

### **Integrated health checks and alerts for integrated Replicat and Extract in Oracle GoldenGate Microservices**

Diagnose and troubleshoot integrated Replicat and Extract processes in Oracle database from Oracle GoldenGate Microservices.

### **DDL notification on target tables for Replicat**

Starting with Oracle GoldenGate 23ai, Replicat uses efficient table DDL change notification to invalidate any cached metadata when you perform a DDL operation on the target table.

For details, see DDL Notification on Target Tables .

### **Support coexistence of Oracle GoldenGate with Data Guard Pluggable Database (DGPDB)**

Oracle Database 23ai functionality has been extended to allow using Oracle GoldenGate in a PDB-based Data Guard (DGPDB) environment in parallel. See Support for DGPDB.

### **New CHKPTDUMP utility**

Oracle GoldenGate 23ai includes a new utility called `chkptdump`, which enables dumping content from checkpoint files. For details, see Location of Programs and Utilities Accessible from the Admin Client.

# 3

## Enhancements

This section highlights the enhancements available with this release of Oracle GoldenGate.

### Release 23ai - May 2024

#### **Added new features to Oracle GoldenGate Configuration Assistant (OGGCA)**

Oracle GoldenGate 23ai added the following new features for better user experience:

- OGGCA is enhanced to allow configuring the following features for the Service Manager and deployment:
  - Enable and configure the StatsD server for the deployment and Service Manager
  - Enable and configure the Configuration Service for the deployment
  - Enhanced security configuration from OGGCA
- Default environment variables are set for `OGG_HOME` and `LD_LIBRARY_PATH`
- Additional configuration options have been provided for the following:
  - Integration with external IDP providers
  - Customization of authentication modes
  - Availability of a sample template of the response file

#### **Added encryption support for user data in cache files and Bounded Recovery Persisted Data Files (PCDFs)**

Oracle GoldenGate 23ai provides encryption support for user data included in cache files and Bounded Recovery persisted data files (PCDFs). For more information, see *Secure Data in Transit*.

#### **Added support for automatic reconnection of parallel Replicat for application continuity**

Added support for automatic reconnection of parallel Replicat with databases on connection failures to maintain application continuity.

#### **Integrated OAuth/SSO with identity domains in OCI Identity and Access Management (IAM)**

Added the following to improve and simplify the integration of OAuth/SSO with identity providers (IDP):

- New OAM profile type
- Validate and enable the authorization profile to automatically configure the confidential application and self-register the redirect URIs

#### **Improved failure detection for distribution and target-initiated paths**

Added WebSocket protocol and asynchronous receive thread to improve the network failure detection process for distributed and target-initiated paths.

### Improved token-based authentication

Oracle GoldenGate 23ai now supports token-based authentication for IDP-enabled deployments. For this, token-access parameter has been added to the `CONNECT` and `ADD CREDENTIALS` commands. In addition, `INFO CREDENTIALS` command has been updated to display the token related information. For more information, see `CONNECT`, `ADD CREDENTIALS`, and `INFO CREDENTIALS`.

### Improved performance monitoring

Added Integrated Diagnostics REST API to obtain performance data to diagnose performance issues related to integrated Extract, integrated Replicat, and parallel integrated Replicat. This is a replacement over the previously used Replication Performance Advisory Utility (UTLRPDAV).

For more information, see Integrated Diagnostics

### Enhanced Functionality for Automatic Conflict Detection and Resolution (ACDR)

Automatic Conflict Detection and Resolution provides improved functionality for the following tasks:

- Removing ACDR entirely from the table or removing ACDR column groups has less impact on the table as the ACDR related columns are marked as `UNUSED` columns. The decision to drop the columns can be made at a later time.
- Starting with Oracle Database 23ai, using `DBMS_REDEFINITION` for ACDR related tables is supported. The `DBMS_REDEFINITION` package can be used to remove unused columns or any other purpose for which the table needs to be reorganized.

See the following topics for details, `Configure Latest Timestamp Conflict Detection and Resolution`, `Support for Online Redefinition`, `Removing Conflict Detection and Resolution From a Table`, and `Removing a Column Group`.

### Oracle Key Vault 21.8 is supported for trail file encryption

Oracle GoldenGate 23ai supports trail file encryption with Oracle Key Vault 21.8. See `Using Oracle Key Vault with Oracle GoldenGate`.

# 4

## Default Behavior Changes

This section describes the default behavior changes made to Oracle GoldenGate in relation to the last release..

### Release 23ai (23.4.2) - June 2024

#### Behavior change in Oracle GoldenGate 23ai

Oracle GoldenGate 23ai introduces the following feature, which impacts the behavior of configuring and using Oracle GoldenGate:

#### Microsoft ODBC Driver 18 for SQL Server

Oracle GoldenGate 23ai for SQL Server now packages the Microsoft ODBC Driver 18 along with the Oracle GoldenGate for SQL Server installation, and database connections will use this driver by default.

### Release 23ai - May 2024

#### Behavior change in Oracle GoldenGate 23ai

Oracle GoldenGate 23ai introduces the following features, which impacts the behavior of configuring and using Oracle GoldenGate:

- In OGGCA, you must use the `#pkcs8` format to upload server, client, and rootCA certificates. Uploading wallets (`#pkcs12`) is not supported. For more information, see [About Service Manager](#).
- When setting up Oracle database 23ai users for Oracle GoldenGate, make sure to use Oracle GoldenGate user roles to assign privileges. For more information, see [Grant User Privileges for Oracle Database 23ai and Higher](#).
- Support for Oracle `Boolean` and `vector` data type for Oracle database. For more information, see [Oracle: Details of Support for Oracle Data Types and Objects](#).
- Support for PostgreSQL `pgvector` extension, `array`, `tsquery`, and `tsvector` datatypes.
- Only per-PDB Extract is used for Extract rather than root-level Extract except for Downstream Capture, where root-level Extract is configured.
- Using Integrated Diagnostics rather than `ULT_RPADV` Diagnostics integrated in Oracle GoldenGate 23ai.

#### Oracle GoldenGate 23ai features for Oracle Database 23ai

#### User roles to grant role-based privileges for Oracle Database 23ai

Oracle GoldenGate 23ai for Oracle Database 23ai has introduced user roles to grant role-based privileges.

For details, see the [Grant User Privileges](#) topic in *Oracle GoldenGate Microservices Documentation*.

# 5

## Deprecated and Desupported Features and Parameters

This section describes the deprecated and no longer supported features of Oracle GoldenGate.

### Release 23ai (23.4.2) Deprecated Features and Parameters - June 2024

#### **Oracle GoldenGate has deprecated DBOPTIONS USEREPLICATIONUSER**

`DBOPTIONS USEREPLICATIONUSER` option has been deprecated.

All SQL Server builds automatically set the connection with `Replication=yes`, and the functionality of `DBOPTIONS USEREPLICATIONUSER` remains the same as long as SQL Server ODBC driver is version 17.8.1 or higher.

### Release 23ai Deprecated Features and Parameters - May 2024

#### **Oracle GoldenGate 23ai has deprecated Integrated Replicat**

Starting with Oracle GoldenGate 23ai, integrated Replicat has been deprecated. As an alternative, you can use parallel Replicat.

### Release 23ai Desupported Features and Parameters - May 2024

#### **Oracle GoldenGate 23ai has desupported Oracle GoldenGate Classic Architecture**

Starting with Oracle GoldenGate 23ai, Oracle GoldenGate Classic Architecture has been desupported.

#### **Oracle GoldenGate 23ai has desupported the following parameters:**

Starting with Oracle GoldenGate 23ai, the following parameters have been desupported:

- `FILTERTABLE`
- `GETREPLICATES`
- `GETAPPLOPS`
- `IGNOREREPLICATES`
- `IGNOREAPPLOPS`

#### **Note:**

The `TRANLOGOPTIONS FILTERTABLE` parameter has been replaced with the `EXCLUDEFILTERTABLE` parameter, but with the same functionality.

**Oracle GoldenGate 23ai has desupported Blowfish encryption**

Starting with Oracle GoldenGate 23ai, Blowfish encryption algorithm has been desupported.

**Oracle GoldenGate 23ai has desupported the Trace Table functionality**

Starting with Oracle GoldenGate 23ai, the trace table functionality has been desupported for Oracle database. Therefore, the following parameters and commands are also desupported:

- **Parameters:**
  - TRACETABLE
  - NOTRACETABLE
- **Commands:**
  - ADD TRACETABLE
  - DELETE TRACETABLE
  - INFO TRACETABLE

**Oracle GoldenGate 23ai has desupported six-digit trail file**

Starting with Oracle GoldenGate 23ai, the six-digit trail file has been desupported.

**Oracle GoldenGate 23ai has desupported the use of userid and password in Extract and Replicat parameter files**

Starting with Oracle GoldenGate 23ai, the use of `userid` and `password` in the Extract and Replicat parameter files has been desupported. Alternatively, you need to use the `useridalias` option.

# 6

## Known Issues and Workarounds

This chapter describes the known issues at the time of release.

### Release 23ai - May 2024

#### **Explicitly exclude Inverted File (IVF) and Hierarchical Navigable Small Worlds (HNSW) index tables**

If you are using wildcard parameters, then IVF and HSNW vector index tables must be explicitly excluded from the Extract.

#### **Workaround**

None



# 7

## Bugs Fixed

This chapter describes the bugs fixed at the time of release.

The Bug number is the number of the BugDB ticket. For questions on specific tickets or issues, consult Oracle Support.

### Release 23ai (23.4.1.24.05) - May 2024

**Bug 36630983: Oracle - Integrated Replicat fails with error "OGG-02092 Unexpected condition in function indexOutOfRangeException"**

Fixed an issue with integrated Replicat either failing with error, `OGG-02092 Unexpected condition in function indexOutOfRangeException`, or skipping update of mapped columns present in the target database but not in the source database, leading to data divergence.