

Oracle® GoldenGate

Using Oracle GoldenGate Studio



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Preface

This preface describes the document accessibility features and conventions that are used in *Oracle GoldenGate Studio Documentation*.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

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.

Related Information

[Oracle GoldenGate Documentation](#)

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

[Oracle GoldenGate Studio Documentation](#)

[OCI GoldenGate](#)

[Oracle Database High Availability](#)

[Oracle GoldenGate Veridata](#)

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

1

Start

Get started with Oracle GoldenGate Studio by exploring new features and installing the product.

GoldenGate Studio Release Notes

Review release information before you install and work with GoldenGate Studio. This document is accurate at the time of publication and is updated periodically with each new software release.

What's New in GoldenGate Studio

Discover new features in GoldenGate Studio 23.9.

- **Deployment management**, where you can manually register and manage multiple replication environments for better scalability and control.
- Support for **Oracle Autonomous Database Wallets** for secure, encrypted credential management, meeting enterprise compliance and security needs.
- **Flexible Initial Load options** with different transfer mediums, including Database Link, Object Storage, and File Storage.
- A new replication recipe, **ZeroETL Mirror**, adding a powerful solution for enterprise scale data integration projects.

See [Comparing GoldenGate Studio Versions](#) to learn more about how this release differs from past versions.

What's supported

Visit [Supported Connection Types](#) to learn which Oracle Database and Oracle GoldenGate versions Oracle GoldenGate Studio supports as source and target connections.

How to get help

Use My Oracle Support to find knowledge solutions, workaround, and other information that is reported by customers, partners, and Oracle employees. My Oracle Support also enables you to open a Service Request. If a patch is required to resolve a service request, you will receive instructions on how to download it from 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.

Note

If you purchased Oracle GoldenGate Studio Commercial and support through a distributor, contact your distributor instead of attempting to create a service request through My Oracle Support.

Use the Community Forum if you are using GoldenGate Studio Free.

Licensing information

Visit [Oracle GoldenGate Licensing Information](#) to review detailed licensing compliance information for Oracle GoldenGate Studio.

Known issues

Learn about known issues within the current release version.

Release 23.9 - October 2025

Bug 38493323: Active-Active - Pipeline failed at Prepare database objects for extraction on target

Pipeline fails while preparing database objects for extraction on target for schema/table mapping.

Workaround

Oracle recommends that you create the user from the GoldenGate Studio application itself, instead of assigning an externally created user.

Bug 38477069: Active-Active - Default conflict resolution type needs to be shown in the GoldenGate Studio user interface

The default conflict resolution type is not displayed in the GoldenGate Studio user interface.

Workaround

None.

Bug 38475961 - Delete all deployments doesn't work when we select them using the select all button

When all the deployments are selected together using the check box left to the headings, the Delete option doesn't work.

Workaround

Select each deployment individually and delete all at once.

Bug 38461500 - Mapping tab in the user interface doesn't reflect the custom Mapping Rules selected in Mapping Rules tab

The mapping rules are not reflected in the Mapping page of the GoldenGate Studio user interface.

Workaround

None.

Bug 38446349 - The status of some steps is not updated in the user interface even though API reflects it properly

Status of certain steps is incorrectly displayed in the user interface while the API reflects the correct status.

Workaround

None.

Bug 38442543 - Certain special characters are not supported in SCHEMA or table name

If special characters are used in SCHEMA or table name then you will not be able to edit or save the pipeline.

Workaround

Use asterisk (*) instead of using special characters when saving the mapping.

Bug 38425814 - Exclude disappears from Mapping rules if Include *.* is deleted

If the **Include *.*** option is deleted from the Mapping Rules table in the Pipeline Configuration Mapping Rules tab, the user interface deletes the **Exclude** option instead of the **Include *.*** option from the user interface.

Workaround

Delete *.* mapping first to avoid this issue.

Bug 38415742 - Active-Active: Could not create pipeline with connection having period in the service name

If an Active-Active pipeline is created with a period in the service name, the pipeline creation fails.

Workaround

None.

Bug 38389703 - When re-running a pipeline, the Extract and Replicat processes are shown stopped though they are actually running in Oracle GoldenGate deployment

After a pipeline is restarted, the Extract and Replicat processes are shown in stopped state although they are running in the Oracle GoldenGate deployment.

Workaround

None.

Bug 38384257 - Even after stopping a job , we see stop job option

Stop button is enabled in the GoldenGate Studio user interface even though the job is initializing and the Extract/Replicat processes are not running.

Workaround

None.

Bug 38314733 - User interface inconsistent with backend status while monitoring Pipelines

Pipeline page in the user interface gets stuck sometimes.

Workaround

None.

Bug 38285621 - GoldenGate Studio pipeline configuration page is stuck when source or target Autonomous Database is not reachable

When there are a lot of connections to an Autonomous Database along with multiple pipelines, GoldenGate Studio keeps on polling the jobs status APIs even when they aren't responding. This creates slowness and the system may get stuck.

Workaround

Ensure that the Autonomous Database is running so that the pipeline configuration page shows valid data.

Bug 35927051 - Incorrect Mapping Rules for a specific mapping pattern

Mapping rules are not saved correctly when a specific mapping pattern is selected in the Mapping Rules page.

Workaround

None.

Schema Mapping and Configuration

When you finish creating a pipeline by clicking on the "Save & Configure" button, you are shown the Mappings section, where all the source's schemas are listed and they all come preselected. If you use accessibility keys such as tab, shift, return, then you can't select or deselect any of the mapping options, nor display all schemas/tables for the drop down list.

Workaround

Use the mouse instead of using the accessibility keys.

Database Version Mismatch

The Initial Load step may fail if the source database version is higher than the target database version causing errors similar to the following:

- **ORA-39059:** Dump file set is incomplete.
- **ORA-39246:** Cannot locate master table within provided dump files.

Workaround

Before initiating replication, ensure that the target database is upgraded to at least the same version as the source database.

Install GoldenGate Studio

The GoldenGate Studio installation process involves preparing your environment, downloading the appropriate software package, and following a guided setup to ensure that all necessary components are correctly configured.

Before You Begin

To use Oracle GoldenGate Studio, ensure that you have:

- A system running Linux
- A valid Oracle.com login
- JDK 24 installed and configured on your system

Get the Installer

To download the GoldenGate Studio installer:

1. Open the Oracle Software Delivery Cloud portal: <https://edelivery.oracle.com/>.
2. Click **Sign In**, and then enter your Oracle account username and password.
3. After you log in, enter **GoldenGate Studio** in the search bar.
4. Click the **Add to Cart** button corresponding to the GoldenGate Studio version that you want to download.

Note

Download the most recent version available to ensure you receive the latest features and security updates.

5. Unzip the Shiphome. Use an appropriate tool (unzip, for example) to extract the archive.
6. Navigate into the extracted disk directory to access the setup files.

Run the Installer

To install GoldenGate Studio:

1. Set the JAVA_HOME environment variable to point to the supported JDK version.
2. Open the command prompt and navigate to the location where the installer files are located.
3. Navigate to the Disk1 folder and run the following command to start the Installation Wizard:

```
cd Disk1
./runInstaller -jreloc $JAVA_HOME
```

4. On the **Installation Type** screen, the Oracle GoldenGate Studio option is preselected. Click **Next**.
5. On the **Specify Installation Details** screen, browse and select the location where you want to install GoldenGate Studio, and then click **Next**. For example, /u01/app/ggstudio/

6. On the **Create Inventory** screen, you can choose a location to store the installation metadata files such as the `install.log`. Also select the user group that is allowed to access this inventory location. By default, the **dba** user group is selected. Click **Next**.
7. On the **Summary** screen, review the settings, and then click **Install**. You can also save the response file for later reference using the **Save Response File** option.

Set Up Deployments Using Oracle GoldenGate Studio Configuration Assistant Wizard

Run the GoldenGate Studio Configuration Assistant wizard to set up and access GoldenGate Studio deployments. Perform the following steps to start the wizard and configure the deployment credentials and security:

Note

You must have Java version 24 or higher installed on your system.

1. Update the PATH environment variable to use JDK 24:

```
export PATH=$JAVA_HOME/bin:$PATH
```

The PATH environment variable is required to run Java commands such as `java`, `javac` using the supported JDK package.

2. From the GoldenGate Studio installation home directory, navigate to the `bin` directory. For example: `cd /u01/app/oggstudio/bin`
3. Run `./oggstudioca.sh`. This opens the Oracle GoldenGate Studio Configuration Assistant wizard.
4. On the **Administrator Account Credentials** screen, specify the **Username** and **Password** for your deployment user account, as shown in the following image.

Oracle GoldenGate Studio Configuration Assistant 23.9.0 - Configuration Wizard - Step 1 of 5

Administrator Account Credentials

Administrator Account

Administrator account:

Username: ggstudio

Password:

Confirm Password:

☒ Enable strong password policy.

Help < Back Next > Finish Cancel

Use these credentials to log in to Oracle GoldenGate Studio for the first time

The strong password policy is enabled by default. It's recommended that you use a strong password for your administrator account. The criteria for a strong password includes:

- 1 uppercase letter (A - Z)
- 1 lowercase letter (a -z)
- 1 digit (0 - 9)
- 1 special character (- ! @ % & * . # _)
- Password length must be between 8 and 30 characters

If you need to change the credentials after the deployment setup completes, you can run the `setPassword.sh` script to modify the credentials of the Administrator Account user. This script is located in the `bin` directory of the GoldenGate Studio home directory (`$STUDIO_HOME`). Here are the steps to run this script:

- a. When you run the script, it asks for the existing user name of the Administrator Account. Specify the user name and press enter.
- b. Now, specify the new password for the specified user. The script prompts you to confirm the password. After the new password matches, the system displays the following message:

The `studio.conf` file updated successfully.

Now, you will be able to use the new password to log in to the GoldenGate Studio user interface.

5. On the **Specify Security Options** screen, specify a **Listening Port Number** on which GoldenGate Studio will run.

Note

By default, the **Listening Port** for the deployment is 8443. You can use different port also.

6. GoldenGate Studio allows you to use self-signed certificates or .pem files for authentication.
- If you choose **Self-Signed Certificates**, then GoldenGate Studio automatically generates a self-signed SSL certificate. This option is useful in a non-production environment where a trusted CA certificate is not required.

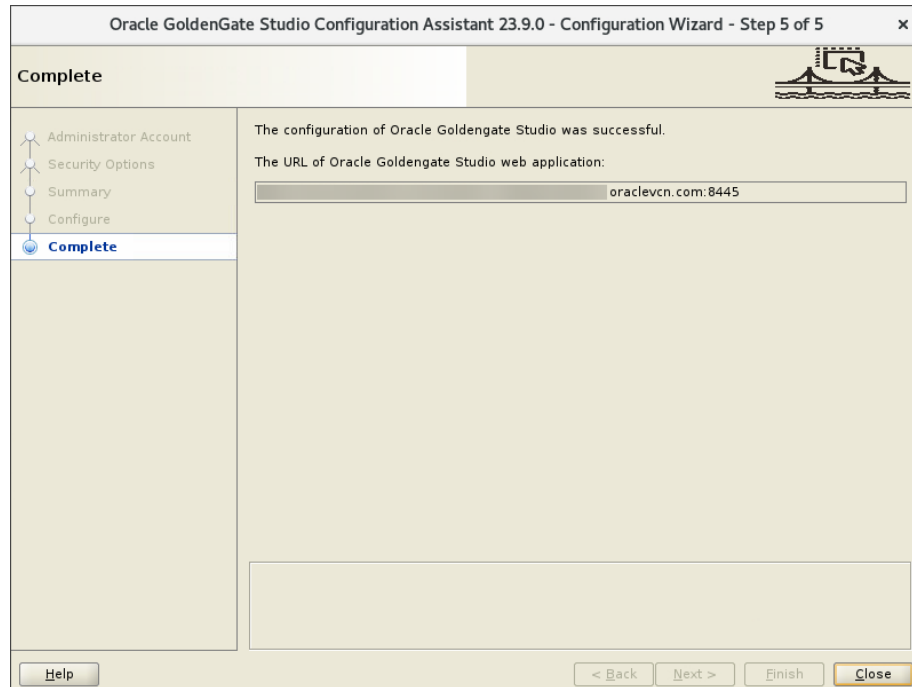
If you choose **Upload Custom PEM Files**, complete the following fields:

- a. **Certificate:** This is the public certificate with a .pem extension that will be used to identify the server to clients. Browse and select the certificate file.
- b. **Private Key:** Browse and select the private key for the certificate.
- c. **CA Certificate File:** This file contains the certificate(s) of the Certificate Authority (CA) that signed the server/client certificate. The CA file is used to verify that the server certificate is trusted.
- d. **Private Key Password:** Enter the password for the private key that must be available with the private key file.

This option is best suited for production environments where an official SSL certificate issued by a trusted CA.

7. Click **Next**.

8. On the **Summary** screen, review the values that you provided in the previous screens and save the response file to a location of your choice. Click **Finish** to begin the configuration process.
The Configure screen shows the progress of the configuration process. After the process completes successfully, it displays the Complete screen, where you can copy the web URL of the GoldenGate Studio.



Connect to the GoldenGate Studio User Interface

Connect to the GoldenGate Studio user interface after the GoldenGate Configuration Assistant Wizard completes to verify your installation.

Use the URL generated by the GoldenGate Studio Configuration Assistant Wizard to access the GoldenGate Studio user interface.

To open GoldenGate Studio:

1. In your web browser, enter the deployment URL generated by the GoldenGate Studio Configuration Assistant Wizard. The GoldenGate Studio login page is displayed.
2. Enter the Administrator Account login credentials you created while setting up the deployment in the GoldenGate Studio Configuration Assistant Wizard. If your log in is successful, you're brought to the GoldenGate Studio Home page.
3. On the GoldenGate Studio Home page, you can learn more about the product using the help options, or register a deployment to get started.

Stop/Restart the GoldenGate Studio Server

You can stop and restart the GoldenGate Studio server using the `runstudio.sh` script, located in the `$STUDIO_HOME/bin` directory.

To stop GoldenGate Studio server instance, run the following command:

```
./run-studio.sh stop
```

To restart the GoldenGate Studio server instance, run the command:

```
./run-studio.sh
```

Install GoldenGate Studio Free

Discover what you need and how to get started with GoldenGate Studio Free.

What You Need

To use GoldenGate Studio Free, you need the following:

- A system running one of the following:
 - Docker, or a compatible container runtime such as Podman
 - Linux
- Internet connectivity to access the container registry
- A valid Oracle.com login

From Oracle Container Registry

Follow these instructions to access the GoldenGate Studio Free from Oracle Container Registry (OCR).

- You must sign in to your Oracle account and accept the license agreement before you can pull the GoldenGate Studio Free docker image from the Oracle Container Registry.
- Obtain an Auth token from the Oracle Container Registry page and use this as your password along with your username.

To access the GoldenGate Studio Free docker image:

1. Accept the license agreement.
2. In your Docker client, enter the following command to log in to the Oracle Container Registry:

```
docker login container-registry.oracle.com
```

3. When prompted, enter your Oracle account username and the Auth token password.
4. Copy the `docker pull` command to pull the latest GoldenGate Studio Free image, and run it in your Docker client:

```
docker pull container-registry.oracle.com/goldengate/goldengate-studio-free:latest
```


Start and run the GoldenGate Studio Free docker image

Learn to start and run GoldenGate Studio Free after pulling the docker image from Oracle Container Registry.

To start and run GoldenGate Studio Free:

1. In your Docker client, you can enter a run command with default settings or enter a run command with parameter values:

- To run GoldenGate Studio Free with default settings:

```
docker run -p 8443:8443 -e STUDIO_ADMIN=studioadmin -e
STUDIO_ADMIN_PWD=<password> container-registry.oracle.com/goldengate/
goldengate-studio-free:latest
```

Note

Ensure that you replace <password> with a password of your choice.

A container instantiates with the following default options:

- An auto generated container name
- 80 port for HTTP Server
- 443 port for HTTPS Server
- studioadmin for the name of the administrative account
- An auto generated self-signed certificate
- To run GoldenGate Studio Free with modified settings:

```
docker run \
  --name <container name> \
  --hostname <domain name> \
  -p <host port>:8443 \
  -e STUDIO_ADMIN=<admin user name> \
  -e STUDIO_ADMIN_PWD=<admin password> \
  container-registry.oracle.com/goldengate/goldengate-studio-
free:latest
```

Parameter descriptions:

- --name <container-name>: Name for the container. Auto-generated by default.
- --hostname <domain name> - The domain name to use for subject name and DNS in the self-signed certificate
- -p <host-port>:8443: The host port to map the Oracle GoldenGate HTTPS server. No mapping by default.
- -e STUDIO_ADMIN: The name of the administrative account to create. by default.
- -e STUDIO_ADMIN_PWD: The password of the administrative account.

 Tip

Ensure the password meets the following requirements:

- * At least one lowercase character [a...z]
- * At least one uppercase character [A...Z]
- * At least one digit [0...9]
- * At least one special character [- ! @ % & * . #]
- * The length should be between 8 and 30 characters.

2. After a few minutes, you should see Server started at: `https://<host-address>:8443`. GoldenGate Studio Free is now ready for you to use.
3. Launch a web browser, and go to `https://<host-address>:8443`.
4. On the GoldenGate Studio Free login screen, enter the username and password that you passed to the docker run command, and then click **Log in**.

After you log in successfully, you're brought to the GoldenGate Studio Free Home page.

Logging

Oracle GoldenGate Studio maintains logs for server and performance analysis, while also allowing debugging of issues by viewing drill-down details in the log.

You can also view the initial load logs for different source and target database combinations.

Server Logs

Explore how to set up and access server and performance logs.

- You can find error message logs for GoldenGate Studio server and performance in the `log` directory. This directory is located in `$STUDIO_INSTALLER_DIR/oggf/log`.
- To search for a GoldenGate Studio server log message, you need to search for the server log name using the name **ggos-api-server%g.log**.
To search for a performance log message, use the name **ggos-api-perf%g.log**.
The **%g** represents index of the file used to maintain the log rotation.
- You can also access logs in the GoldenGate Studio user interface. To view details about the cause and action of an error message, select the error code (OGGOS-60000, for example).

You can configure different levels of logging for GoldenGate Studio Server and performance logs. For more information, see [Configure Log Levels for Server and Performance Logs](#).

Initial Load Logs

There are two types of logs generated for the initial load process:

- **EXPDAT* .log**: Export log from the source database.
- **IMPDAT* .log**: Import log from the target database.

The location of the log files depends on the transfer medium (DBLink, Local Storage, and Object Storage) and type of database (Autonomous Database, or non-Autonomous Database). To learn about log retrieval of these log files, see [Retrieve the Initial Load Log Files](#).

Uninstall GoldenGate Studio

Before you begin the uninstallation process, make sure that you stop any GoldenGate Studio instances.

Perform the following steps to uninstall GoldenGate Studio:

1. Shut down a running GoldenGate Studio instance by executing the following script:

```
./STUDIO_HOME/bin/run-studio.sh stop
```

2. Set the JAVA_HOME environment variable to point to a supported JDK version. Ensure that Java version 24 or higher is installed on your system.
3. Run the following script to uninstall:

```
./STUDIO_HOME/deinstall/deinstall.sh -jreLoc $JAVA_HOME
```

2

Introduction

Learn about GoldenGate Studio concepts to help you get started.

About GoldenGate Studio

GoldenGate Studio helps you to design and deploy high-volume, real-time replication by automatically handling table and column mappings and generating best practice configurations from recipes. With GoldenGate Studio, you can start replicating data using a simple interface. GoldenGate Studio supports features such as multiple deployment management, authentication using Oracle Wallet for secure credential management for Oracle Autonomous Databases, and validation utilities like **Test Connection** for reliable environment setup.

GoldenGate Studio is available in two editions: a **free version** with community-based support, and a **commercial version**. The commercial is ideal for organizations that require comprehensive Oracle Support, including access to regular upgrades and patches, ensuring a stable and maintainable environment for production use. This edition is particularly beneficial for organizations running mission-critical workloads, as it offers the ongoing support and regular updates necessary to keep complex environments secure and up to date. By providing full Oracle Support, the commercial version ensures smooth operations and minimizes risk for enterprise data integration initiatives.

GoldenGate Studio delivers an enterprise-ready platform with advanced features, broader compatibility, scalable deployment options, and access to Oracle support. GoldenGate Studio provides you with the following abilities:

- Quickly create, modify, validate, deploy, and reuse Oracle GoldenGate best practice designs.
- Define data flows once and deploy to numerous locations.
- Graphically filter, map, and transform data.
- Apply global rules and exceptions.

Who is GoldenGate Studio for?

GoldenGate Studio is ideal for database administrators, architects, and IT professionals responsible for setting up and maintaining data integration and replication solutions.

GoldenGate Studio is ideal for a wide range of users involved in data integration and replication projects, especially database administrators, data architects, and IT teams responsible for doing replication across multiple Oracle databases and locations. For those already using GoldenGate, GoldenGate Studio will enhance the experience by offering a highly intuitive, visual interface that significantly simplifies the process of designing, deploying, and managing replication environments. Its guided workflows make it easy to configure and monitor even complex data integration setups, reducing manual effort and streamlining the entire lifecycle of GoldenGate projects.

GoldenGate Studio makes it easier for both new and experienced GoldenGate users to handle everything from simple data integrations to complex, enterprise-wide deployments.

What can I use GoldenGate Studio for?

GoldenGate Studio enables you to visually design, deploy, and monitor end-to-end data replication and integration environments with GoldenGate.

GoldenGate Studio makes it simple and efficient to set up, deploy, and manage real-time data replication solutions across Oracle databases. It helps you generate and validate GoldenGate configurations based on best practices—allowing you to quickly build, modify, and reuse replication projects without writing manual scripts. With GoldenGate Studio, you can define powerful data flow designs and deploy them simultaneously to multiple locations, ensuring that data stays synchronized across all your critical systems.

Features like filtering, mapping, and transforming data are easily configured in GoldenGate Studio. This helps you align replication with your specific business logic. Organizations can ensure that only the right data is replicated, in the right format, to meet their operational and analytical needs. This means data replication isn't just a copy-paste activity; it's tailored to support your specific use cases, compliance needs, or reporting standards.

Comparing GoldenGate Studio Versions

Explore the differences between the previously released GoldenGate Studio Free 23.7 and the current GoldenGate Studio 23.9 offerings. GoldenGate Studio 23.9 is available in Commercial and Free version.

Feature	GoldenGate Studio Free 23.7	GoldenGate Studio 23.9 Commercial and Free
About	GoldenGate Studio Free 23.7 is designed as an entry-level, easy-to-use version for individuals or teams exploring data replication or working with non-production and small-scale Oracle databases.	GoldenGate Studio 23.9 Commercial and Free provides the full suite of enterprise replication features for robust, large-scale, and mission-critical implementations.
Supported Environments	Intended for development, testing, training, or small production workloads (up to 20 GB databases)	Supports both production and non-production environments, handling large, enterprise-scale workloads.
Supported Databases	Oracle databases only (19c, 21c, 23ai).	Supports Oracle databases (19c, 21c, 23ai), Oracle Exadata and Oracle Autonomous database.
Deployments	Manual deployment creation is not supported. A single deployment is automatically created and managed by the system when the application is first started.	Need to register at least one deployment.
Multiple Deployments	Supports only one deployment that comes packaged with GoldenGate Studio Free 23.7.	Supports multiple deployments. You can use a single deployment for both source and target databases.
Validate and Run analysis tools	Use Validate and Run analysis tools during connection creation.	Validation and run analysis are done during Pipeline creation.
Recipes	Includes two recipes: One-way and Active-active Recipe.	Includes three recipes: One-way, Active-active and ZeroETL Recipe.

Feature	GoldenGate Studio Free 23.7	GoldenGate Studio 23.9 Commercial and Free
Oracle Wallet	This feature is not supported.	Supports Oracle Wallet for secure storage and management of database credentials, enhancing security and compliance. Can upload Oracle Wallets when creating Autonomous Database (ADB) connections.
Test Connection	This feature is not supported.	Use Test Connection to verify the connectivity between GoldenGate Studio and a database endpoint. You can save time diagnosing issues that could have been identified early with a connectivity check. This reduces the chance of runtime errors or failures.
User alias	This feature is not supported.	Supports User alias to facilitate aliasing of user credentials, allowing for more flexible and secure authentication scenarios.
Advanced Options in Initial Load	Limited set of features, simplified UI, some advanced options are unavailable or restricted.	Need to add user alias, specify the source wallet URI, and select transfer medium for Initial Load such as Database Link, Object Storage, and File Storage.
Support	Community support only (no Oracle Support). Questions regarding GoldenGate Studio Free can be posted in the GoldenGate Studio Free Community Forum .	Commercial version is eligible for Oracle Support and Free version is eligible for Community Support only.

GoldenGate Studio Concepts

Get familiar with the following concepts and other commonly used terms before you get started with GoldenGate Studio.

Concept	Definition
Deployment	The process of setting up and activating your data replication design so it can run in a real environment. A GoldenGate Studio deployment is GoldenGate's instance, configured to run pipelines. Learn how to Register Deployments.
Connection	Contains the connectivity information for source and target databases used in pipelines. Learn how to: - Create Oracle Database and Oracle Exadata Connection - Create Oracle Autonomous Database Connection
Recipe	A predefined template in GoldenGate Studio that automates the design and creation of data integration solutions, specifying how source and target systems interact. Learn about Recipes.
Pipeline	A pipeline enables replication across diverse database environments. Learn how to Create Pipelines.
Mapping Rules	Rules for including or excluding schemas and tables in a data replication.

Concept	Definition
Advanced Options	Editable process or load parameters for Extract, Replicat, and data pump operations. Learn more: • Initial Load Advanced Options • Extract Advanced Options • Replicat Advanced Options
Extract	Process that reads or captures database changes from the source database.
Replicat	Process that applies captured changes to the target database.

GoldenGate Studio Limitations

Learn about the limitations of using GoldenGate Studio.

There are certain limitations and considerations that you should be aware of when using GoldenGate Studio.

- GoldenGate Studio doesn't currently support Oracle Cloud Infrastructure GoldenGate deployments.
- GoldenGate Studio works in top down approach. It generates GoldenGate Connections, Extracts, Replicats, and Trail Files based on connections and pipelines created in GoldenGate Studio.
- Existing Connections, Extracts, Replicats, Trail Files in Oracle GoldenGate can't be used by GoldenGate Studio pipelines.
- Refrain from changing Extract, Replicat, and parameter files that are generated by GoldenGate Studio in Oracle GoldenGate. Once these files are changed, editing or running these pipelines from GoldenGate Studio lead to inconsistencies and failures.

3

Replicate

Follow the basic taskflow to replicate data in no time.

The Replicat process in GoldenGate Studio follows these steps, in sequence:

1. Register a deployment. A single GoldenGate deployment must be used for both source and target databases.
2. Create database connections. Specify the connection details (such as host, port, service name, username, and password) for the source or target database to enable data replication design and deployment.
3. Create pipelines. Use one of the included recipes to get started.
4. Configure pipelines. Add mapping rules and configure advanced options.
5. Monitor the pipelines. Check the real time visual pipeline diagram, that updates as you make changes to the pipeline configuration.

Deployments

Oracle GoldenGate Studio connects to an Oracle GoldenGate on-premise instance and mirrors the replication processes from the Oracle GoldenGate Studio user interface, allowing further processing.

About Deployments

A GoldenGate Studio deployment process maps a designed and tested data replication solution from Oracle GoldenGate.

A GoldenGate Studio deployment generates and moves the necessary configuration and parameter files to the GoldenGate Studio target servers, so that the GoldenGate processes can be started and managed in a production environment.

With GoldenGate Studio deployments, you can:

- Connect and manage multiple Oracle GoldenGate environments from a single interface, providing flexibility and centralized control. Rather than designing pipeline for every environment, you can just reuse your existing pipeline and change its target to deploy to a different environment.
- Use different GoldenGate deployments for testing, development, or production. This means you can safely build and test your pipelines before running them in your live environment.
- Update, modify, or relocate them directly on the target systems without impacting your design work or project configurations within GoldenGate Studio.

This means if you make changes directly to GoldenGate configurations or processes on those servers (for example, editing parameter files, changing process settings, or moving processes to another server), those changes do not automatically affect or update the design and settings stored in GoldenGate Studio.

- Manage each deployment's lifecycle separately, performing operations like start, stop, upgrade, or delete without affecting other environments. For example, while upgrading the test deployment, the production deployment continues running without interruption.
- Create new deployments to support additional teams, projects, or regions. For example, expanding into a new business unit or region simply requires spinning up a new deployment to handle its unique replication needs.

You must register at least one deployment before you create and run any pipelines.

Register Deployments

Learn to register Oracle GoldenGate deployments in GoldenGate Studio.

To register a deployment:

1. From the navigation menu, click **Deployments** and then click **Register Deployment**.
2. In the **Register Deployment** panel, complete the fields as follows:
 - a. Enter a **name** of the deployment.
 - b. (Optional) Enter a **Description**, to help distinguish this deployment from others.
 - c. Enter deployment's **Hostname** or IP address.
 - d. Enter the **Port** number of the deployment's Administration Service.
 - e. Enter the **Username** of the Oracle GoldenGate administrator user. See Authorization in Oracle GoldenGate .
 - f. Enter the **Password** of the Oracle GoldenGate administrator user.
 - g. Select **Use Reverse Proxy** only if it's configured for the Oracle GoldenGate instance.
3. Click **Test Connection** to ensure GoldenGate Studio can connect to Oracle GoldenGate. If the deployment connects successfully, then the **Next** button becomes activate.
4. Click **Next**. On the Confirmation screen, review the deployment details, and then, click **Save**.

Connections

Database connections store the credentials and parameters required to access databases that serve as sources or targets in GoldenGate Studio. This configuration enables secure and efficient communication for designing and deploying data replication pipelines.

Database connections in GoldenGate Studio represent the configuration information required to communicate with your source and target databases. These connections are the foundation for designing, deploying, and managing data integration and replication solutions within the GoldenGate Studio. They enable you to visually map the data flow across diverse environments.

For details, see the Database Connection, System and Parameter Settings for Oracle database in *Oracle GoldenGate Microservices Documentation*.

Note

Some features, such as **Validate** and **Run Analysis**, have been moved from **Database Connection** to **Create Pipeline** workflow.

About Connections

Learn about the connection types you can use with GoldenGate Studio and how to create them.

A database connection refers to the configuration information and credentials GoldenGate Studio needs to connect to a database. This connection allows GoldenGate Studio to access and interact with the source and target databases as part of designing, deploying, and managing data replication solutions.

GoldenGate Studio currently supports Oracle Database connections.

Supported Connection Types

Check the following list for specific Oracle Database versions you can use as sources and targets in GoldenGate Studio. Oracle Autonomous Database and Oracle Exadata are also supported.

The following Oracle Database versions are supported:

- Oracle Database 19c
- Oracle Database 21c, 21c XE
- Oracle Database 23ai, 23ai Free

Best Practices for Connections

Discover best practices for Connections in Oracle GoldenGate Studio.

Plan Before Creating the Connection

- **Identify Connection Requirements:** Gather details such as database type, hostname, port, service name/SID, user credentials, and SSL requirements before starting.
- **Verify Access Privileges:** Ensure the user account has the required permissions for GoldenGate operations (e.g., replication privileges, read/write access to specific schemas).

Use Secure Credentials Management

- **Avoid Hardcoding Credentials:** Store usernames and passwords securely in the GoldenGate credential store instead of saving them in plain text. Do not store passwords in scripts or plain text.
- **Oracle Wallet or Oracle Cloud Wallet services:** Use Oracle Wallet or Oracle Cloud Wallet services to store Oracle Autonomous Database credentials and encryption keys securely.
- **Use Role-Based Accounts:** Create separate database accounts for replication activities, with only the necessary privileges.
- **Change Default Passwords:** Immediately update default or shared account passwords to meet your organization's security policies. Regularly rotate passwords according to your organization's security policy.

Ensure Compatibility

- **Verify Database Version:** Check that your source and target databases are compatible with the GoldenGate version you are using.

- **Install Required Drivers:** Ensure JDBC drivers for the database type are installed and configured in GoldenGate Studio.

Optimize Connection Settings

- **Enable SSL/TLS if Available:** Use encrypted connections to protect data in transit.
- **Set Connection Timeout:** Configure timeouts to prevent long waits in case of connectivity issues.
- **Use Connection Pooling Where Possible:** This improves performance for multiple GoldenGate processes using the same connection.

Validate the Connection

- **Test the Connection in Studio:** Use the **Test Connection** feature in GoldenGate Studio to confirm connectivity and authentication.
- **Verify Schema Access:** Ensure the connected user can access the specific schemas, tables, and views needed for replication.
- **Check Performance:** Run small test queries to assess response time before deploying the connection in production.

Maintain and Monitor

- **Document the Connection Details:** Maintain an internal record of connection parameters, privileges, and owner for auditing.
- **Regularly Rotate Credentials:** Update stored passwords periodically to comply with security policies.
- **Monitor Connection Health:** Use GoldenGate monitoring tools to check for connection drops, slow queries, or authentication failures.

Create Oracle Database and Oracle Exadata Connections

Learn how to create Oracle Database and Oracle Exadata connections.

1. From the GoldenGate Studio Home page, click **Create connection**. You can also create a connection from the **Connections** page.
2. The Create Connection panel consists of three pages. On the **General Information** page, complete the following fields, and then click **Next**:
 - a. Enter a **Connection Name**.
 - b. (Optional) Enter a **Description**.
 - c. Select a **Technology Type** from the dropdown menu.
3. On the Connection Details page, complete the following fields, and then click **Next**:
 - a. Enter the database **Username** and **Password**.
 - b. Enter the database **Hostname** and **Port**
 - c. For **Database Type**:
 - If your Oracle database version is 21c or above, select **Pluggable database (PDB) in Oracle Database 21c or above**.
 - If your Oracle database version is 19c or below, select **Pluggable database (PDB) in Oracle Database 19c or below** and provide both the **Pluggable database service name** and the **Container database service name**

- If your Oracle database version is Non-container database, select **Non-container database** and then enter the **Database service name**.
4. On the Confirmation page, click **Create**.

Configure and Download SSL Wallet for Non-Autonomous Database

Learn about the different **Wallet Configuration** options.

Wallet configuration is required in non-Autonomous Databases to enable secure connectivity. This setup facilitates verified communication with endpoints such as parUrl using SSL verification or other Autonomous Databases hosted in secure regions over HTTPS, especially needed to upload and download files from secured parUrl / bucketUri in initial load using Object Storage.

Why Is Wallet Configuration Important?

Without a properly configured wallet, attempts to connect securely to Object Storage or other endpoints using HTTPS will fail, leading to errors or inability to upload/download files. Configuring a wallet reduces these risks by ensuring that your database trusts the cloud endpoints you're connecting to.

Important Terms

Term	Definition
parUrl	Pre-authenticated Request URL for secure, temporary access to objects in Oracle Cloud Object Storage.
bucketUri	A Uniform Resource Identifier pointing to a specific bucket in Oracle Cloud Object Storage. A bucket is a storage container for objects (such as files or data dumps).
Oracle Cloud Endpoint	URL for connecting to Oracle Cloud services.
ACL (Network Access Control List)	Security rules that define which network traffic is allowed or denied to network resources.

Standard Oracle Wallet

Learn about Standard Oracle Wallet.

An Oracle Wallet is a secure, encrypted container that stores authentication and encryption credentials like private keys, certificates, and trusted certificates. It ensures that sensitive data is not kept in clear-text configuration files. You create these wallets using tools like the Oracle Wallet Manager or mkstore, and they require a password to open and access contents. To enable secure connectivity from a non-autonomous database, wallet setup is required.

Follow these steps to download/configure Standard Oracle Wallet:

- Download the master wallet containing pre configured Oracle certificates. Contact the database administration team for this.
- Extract the certificate files to a directory on the database host file system.
- Specify this directory path in the SSL Wallet Path fields under the **Advanced Options**.

Note

- This wallet should serve the purpose for establishing secure connection with `parUrl` or `bucketUri` (typically used in case of Initial load via Object Storage).
- Any required Network ACL configurations are automatically managed by the Studio application at runtime when access is initiated.

Using the Oracle-supplied wallet automatically enables secure connectivity for standard Oracle Cloud endpoints (like `parUrl` and `bucketUri`).

Manual Wallet Configuration

Learn how to configure Manual Wallets:

The **Manual Wallet** approach allows users to create and configure a wallet by manually adding specific security certificates that are not included in the Standard Oracle Wallet. This method is necessary when connecting to custom endpoints, using third-party certificate authorities, or addressing unique security requirements.

Follow the below steps to download/configure Manual Wallet:

- Download the required certificates for the `parUrl`- typically a root certificate and an intermediate certificate.
- Log in to the database host and create a wallet directory.
- Initialize a wallet using `orapki` utility available in Oracle base.
- Add certs downloaded from `parUrl` to wallet using `orapki` utility.
- Commands to be used are :
 - `bash-4.2$ mkdir -p <wallet-path-accessible-to-db-user>`
 - `bash-4.2$ orapki wallet create -wallet <wallet-path-accessible-to-db-user> -pwd <pwd> -auto_login`
 - `bash-4.2$ orapki wallet add -wallet <wallet-path-accessible-to-db-user> -trusted_cert -cert <path-to-root-certificate> -pwd <pwd>`
 - `bash-4.2$ orapki wallet add -wallet <wallet-path-accessible-to-db-user> -trusted_cert -cert <path-to-intermediate-certificate> -pwd <pwd>`
 - `bash-4.2$ orapki wallet display -wallet <wallet-path-accessible-to-db-user>`

Create an Autonomous Database Connection

Learn to create a connection to Oracle Autonomous Database to use as a GoldenGate Studio source or target.

Before you begin

Before you create a connection, ensure that you:

- Turn on **Archive Log Mode** and restart your database.
- Download the Autonomous Database instance's wallet from the Oracle Cloud console. If you don't have access, contact your administrator.

To create an Autonomous Database connection:

1. From the **GoldenGate Studio** home page, click **Create connection**.
2. The Create Connection panel consists of three pages.
 - a. On the **General Information** page, complete the fields as follows, then click **Next**:
 - i. Enter a **Connection Name**.
 - ii. (Optional) Enter a **Description**.
 - iii. Select **Oracle Autonomous Database**, from the **Technology Type** dropdown.
 - b. On the **Connection Details** page, complete the fields as follows, and then click **Next**:
 - i. Enter a **Username** and **Password** for the GoldenGate admin user.
 - ii. Click **Add Wallet File** and upload the Autonomous Database instance's wallet.
 - iii. Click **Test Connection**.
 - c. On the Confirmation page, verify the connection details.
3. Click **Create**.

Pipelines and Recipes

Learn to create data replication processes using recipes and pipelines.

About Pipelines

A pipeline is an instance of a recipe. It enables you to select your source connection, the type of replication action(s) to apply, and the target connection. After a pipeline starts, you can observe the replication process in real time.

If you're familiar with Oracle GoldenGate Extract and Replicats, pipelines are an abstraction of the Oracle GoldenGate replication process. When you start a pipeline, Oracle GoldenGate:

- Prepares the database objects for extraction
- Creates a Heartbeat Table
- Creates and runs the Extract process
- Performs an initial load using Oracle Data Pump
- Creates the Checkpoint Table
- Creates and runs the Replicat process

These steps can be observed during the pipeline's Initialization phase on the Pipeline Details page.

You can view pipelines on the Home page, as well as the Pipelines page. Before you create a pipeline, ensure that you have [Connections](#) configured for the source and target databases.

To know more, see About Extracts and About Replicats in *Oracle GoldenGate Microservices Documentation*.

About Recipes

Recipes are templates for common replication scenario that you can use to accelerate your data replication journey.

A Recipe is a template that defines a set of data replication tasks or mappings between source and target systems. Recipes help simplify and accelerate the creation of replication solutions. Using a recipe reduces the time and effort required to set up a new data integration projects, ensuring consistency and reliability across different environments.

- **One-way database replication:** Performs an initial load and ensures the target database is kept in sync with the source database.
- **Active-Active database replication:** Performs an initial load of the source database to the target, and then applies change events in both directions to keep the databases synchronized.
- **ZeroETL Mirror:** Provides near real-time replication from an operational database to an analytics or reporting environment without requiring traditional ETL (Extract, Transform, Load) processes. This recipe simplifies architecture and delivers up-to-date data for analytics with minimal latency.

Note

If you encounter a warning about sequences detected, ensure that you don't replicate database generated sequential values. The range of values must be different on each system, with no chance of overlap. For example, in a two-database environment, you can have one server generate even values, and the other odd. For an n -server environment, start each key at a different value and increment the values by the number of servers in the environment. This method may not be available to all types of applications or databases. If the application permits, you can add a location identifier to the value to enforce uniqueness.

Create a Pipeline

Learn to create pipelines in GoldenGate Studio.

Before You Begin

Before you create a pipeline, ensure that you've created and tested the source and target database connections.

If you want to use Oracle Autonomous Database as your pipeline's source or target connection, you must:

1. **Configure Autonomous Database:**
 - a. **Download the Wallet:** Download the Autonomous Database wallet from the instance's details page in Oracle Cloud Infrastructure. You'll upload it to GoldenGate Studio when you create the connection, if you haven't done so already.
 - b. **Configure TNS Alias:** Use the alias from `tnsnames.ora` inside the wallet for the Autonomous Database connections.
 - c. **Check Client Credentials:** Make sure username and password are available and have permission for the GoldenGate replication operations.
 - d. **Verify Autonomous Database Firewall and VNet rules:** Ensure appropriate network access so GoldenGate Studio can reach your Autonomous Database.

Note

Ensure that your wallet and credentials management comply with the Oracle security policies.

2. **Target Database Access:** Configure and validate connectivity to your target database (which can be Autonomous Database or any other supported Database).
3. **User Alias Configuration:**
 - a. **Create a credential store with a user alias.** Complete steps 3 to 6 in *Configure Extract for Oracle Autonomous Database*. The user alias references the secure credentials for the source and target databases.
 - b. Register the user alias in the GoldenGate credential store, and enter this user alias in GoldenGate Studio when creating pipelines with Autonomous Database connections to avoid storing plain-text credentials.

Note

To verify if the user alias is functioning correctly, go to your **GoldenGate** user interface and test the DB Connections there first. See *Prerequisites for Capturing from Autonomous Database in Oracle GoldenGate Microservices Documentation*.

4. **Database Privileges:** You need the required database permissions on the source and target side to support GoldenGate operations (typically SELECT, FLASHBACK, DBA-level privileges, and so on).

Create a Pipeline

To create a pipeline:

1. From the **GoldenGate Studio** Home page, click **Create Pipeline**.
You can also select **Pipelines** from the navigation menu, and then click **Create Pipeline** on the Pipelines page.
2. The Create Pipeline panel consists of 6 pages:
 - a. On the Recipe page, select a **Recipe**, and then click **Next**.
 - b. On the Overview page, enter a **Name** and optionally, a **Description**, and then click **Next**.
 - c. On the Connections page, select the **Source** and **Target Connections** and **Deployments**. If either of the connections is an Autonomous Database instance, you must also provide the **GoldenGate user alias**. Click **Next**.
 - d. On the Validate Source page, click **Validate** to check and prepare the source database connection for replication. After the validation for source database completes successfully, click **Next**.

If the source validation fails, then a new step, **Configure Source** is added. See [Validate Source and Target Database Connections with SYS User](#) to perform validation in this steps.
 - e. On the Validate Target page, click **Validate**.

If the target validation fails, then a new step, **Configure Target** is added. See [Validate Source and Target Database Connections with SYS User](#) to perform validation in this steps.

f. On the Confirmation page, click **Save & Continue**.

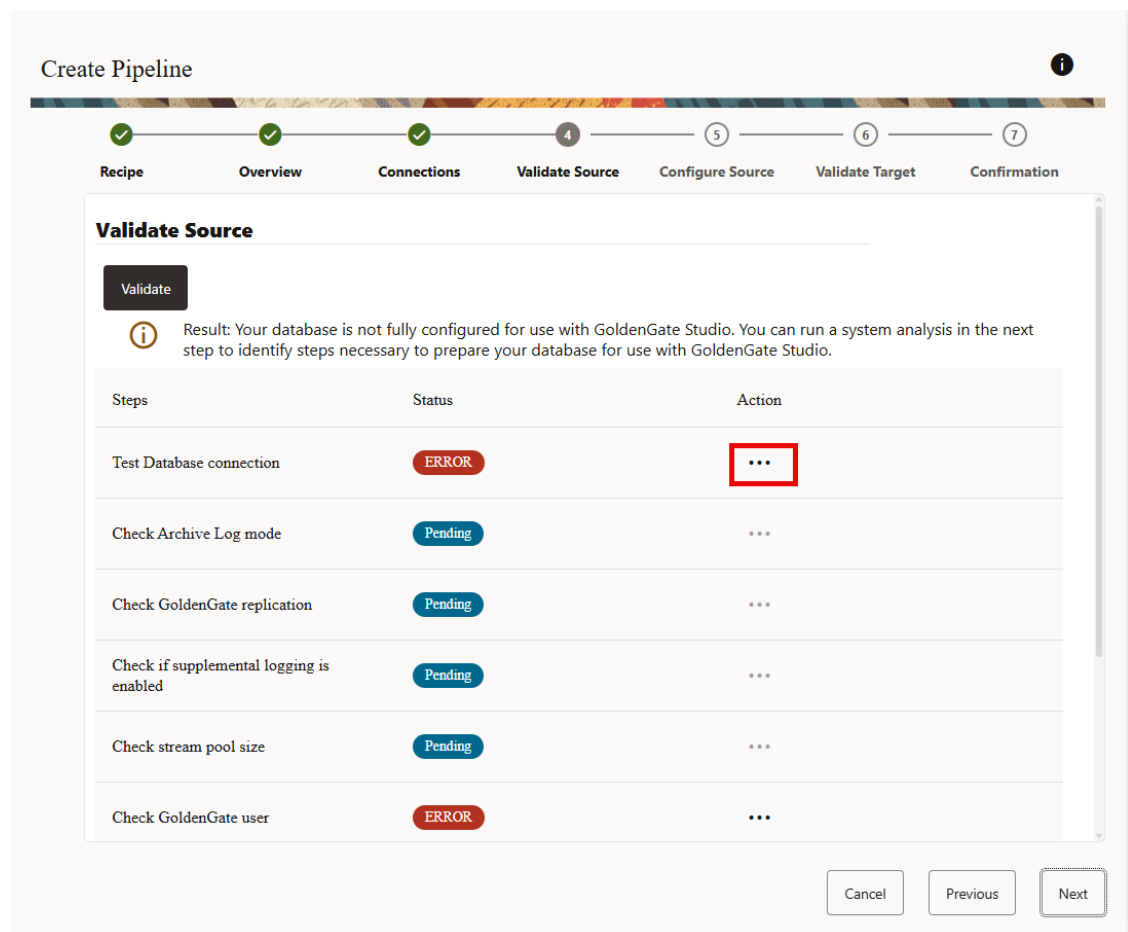
3. You can now [Configure the pipeline](#), or click **Start**.

After the pipeline starts, you can view detailed status and logs for each pipeline. This helps identify and troubleshoot errors, in case the pipeline creation process fails.

Validate Source and Target Database Connections with SYS User

This step is required only when the source and/or target database connection validation fails while creating a pipeline.

If a source validation step fails, then the validation source status displays an error. You can use the Action menu (ellipses) to view the error details for the validation failure, as shown in the following image:



The following steps are required to validate the source database connection using a SYS/SYSDBA user.

1. When the validate source connection step fails, click **Next** in the **Validate Source** screen. The **Configure Source** screen is displayed.

2. In the **Configure Source** screen, enter credentials for SYS user or a user with the SYSDBA role, as shown in the following image:

Create Pipeline

Recipe Overview Connections Validate Source **Configure Source** Validate Target Confirmation

Configure Source

Enter credential for SYS or user with SYSDBA role

Username: SYS Password:

You can run a system analysis to identify steps necessary to prepare your database for use with GoldenGate Studio. This step requires DBA privileges but will not change the database. It will offer a SQL script for your review to run or download.

Run Analysis

You can download an interactive generation script to identify steps necessary to prepare your database for use with GoldenGate Studio. This script requires DBA privileges will create SQL commands to prepare the database. After downloading the script, please save this connection and validate the connection after configuring the database.

Download Analysis Script

Cancel Previous Next

3. Select one of the following options:

Note

The availability of SQL command options in the user interface depends on the database configuration.

- Click **Run Analysis** to perform a system analysis and review the recommended SQL script needed to prepare your database for GoldenGate Studio (requires DBA privileges).
This option is available when the database is already configured and does not require additional configuration allowing you to execute the required scripts directly from the interface, streamlining the setup process.
 - Click **Download SQL** to obtain a script that generates the required SQL commands for configuration.
This option is available for databases that require manual configuration of enabling archive log, setting up `stream_pool_size`, or configuring GoldenGate replication for Oracle Database 19c, as these tasks may require a database restart. In these instances, you must first configure the database before proceeding.
4. If the target validation fails, then click **Next**. The **Configure Target** screen is displayed, as shown in the following image:

Create Pipeline

Recipe Overview Connections Validate Source Validate Target **Configure Target** Confirmation

Configure Target

Enter credential for SYS or user with SYSDBA role

Username: SYS Password:

You can run a system analysis to identify steps necessary to prepare your database for use with GoldenGate Studio. This step requires DBA privileges but will not change the database. It will offer a SQL script for your review to run or download.

Run Analysis

You can download an interactive generation script to identify steps necessary to prepare your database for use with GoldenGate Studio. This script requires DBA privileges will create SQL commands to prepare the database. After downloading the script, please save this connection and validate the connection after configuring the database.

Download Analysis Script

Cancel Previous Next

5. Follow the tasks given in step 3 for validating the target database connection using the SYS/SYSDBA user.

Configure a Pipeline

You must have a pipeline created before you can configure it.

After you create a pipeline, the **Configuration** page is displayed. If you're revisiting a pipeline after creating it, you can select the pipeline from the **Pipelines** page to view its details, and then click **Configuration** to return to the Configuration page.

To configure a pipeline:

1. Under **Mapping**, you can review and select the source database schemas and tables to replicate.

Note

The username entered when creating the connection will not appear on the pipeline **Mapping** page for mapping selection.

Always double check the rules added in the Mapping Rules list after selecting or deselecting schemas or tables using the **Mapping** tree view. These are the source of truth on what will be executed by Oracle GoldenGate.

Overview Configuration

Pipeline Name: demo2
Recipe Name: Active-Active Database Replication

Cancel Save

Pipeline Diagram

Source: sourceDB ✓

Active-Active Database Replication

Target: targetDB ✓

Mapping Mapping Rules Options

Search Table

Source Schema	Target Schema	Conflict Resolution
PDBADMIN	PDBADMIN	
HR	HR	
COUNTRIES	Not Found	Latest TS
DEPARTMENTS	Not Found	Latest TS
EMPLOYEES	Not Found	Latest TS
JOBS	Not Found	Latest TS
JOB_HISTORY	Not Found	Latest TS
LOCATIONS	Not Found	Latest TS
REGIONS	Not Found	Latest TS

Note

In One-way database replication, target schemas and tables show only when they exist in the target, otherwise they show as **Not found**.

The following image shows a one-way replication pipeline:

Overview Configuration

Pipeline Name: One_way_pipeline_1
Recipe Name: One-way Database Replication

Cancel Save

Pipeline Diagram

Source: JK_src_conn

One-way Database Replication

Target: JK_tgt_conn

Mapping Mapping Rules Options

Search Collection

Source Schema	Target Schema
TEST_USER10	TEST_USER10
TEST_USER4	TEST_USER4
TEST_USER5	TEST_USER5
TEST_USER11	TEST_USER11
TEST_USER111	TEST_USER111
JK_TEST_USER	JK_TEST_USER
JK_TEST_USER1	JK_TEST_USER1
JK_TEST_USER2	JK_TEST_USER2
JK_TEST_USER3	JK_TEST_USER3
JK_SCHEMA10	Not Found
JK_SCHEMA9	JK_SCHEMA9
EMPLOYEES	EMPLOYEES
EMPLOYEES1	EMPLOYEES1

2. Using the **Mapping** tab, you can:

- Click **Edit** (pencil icon) to rename a target schema or table. This redirects the replication to the renamed schemas and tables.
- Include a schema and all its tables. This also ensures that any tables added to the schema in the future are also implicitly included and replicated.

- Include a schema but not all its tables. Tables **not** included will not be replicated, however, future tables added to the schema are implicitly included and replicated to the target.
- Exclude the schema but include its tables. Any tables added to the schema in the future are **not** included.
- Exclude an entire schema and all its tables.

As you select or deselect source schemas and tables, or edit target schemas or tables, rules are added to **Mapping Rules**.

3. For Active-Active replications, a **Conflict Resolution** column appears in the Mapping screen.

The screenshot shows the Oracle GoldenGate Studio Configuration screen for an Active-Active pipeline. The Pipeline Diagram on the left shows a source schema 'JK_src_conn' connected to a target schema 'JK_tgt_conn' via an 'Active-Active Database Replication' recipe. The Mapping table on the right shows the following mappings:

Source Schema	Target Schema	Conflict Resolution
TEST_USER10	TEST_USER10	Latest TS
EMPLOYEES	EMPLOYEES	Latest TS
EMPLOYEES1	EMPLOYEES1	Latest TS
EMPLOYEES2	EMPLOYEES2	Latest TS
TEST_USER4	TEST_USER4	Latest TS
EMPLOYEES	EMPLOYEES	Latest TS
EMPLOYEES1	EMPLOYEES1	Latest TS
EMPLOYEES2	EMPLOYEES2	Latest TS

✓ Tip

In Active-Active pipeline, Automatic Conflict Detection and Resolution (ACDR) is enabled for tables if it is not already enabled. If ACDR is already enabled, then GoldenGate Studio will not modify the configuration.

To configure Automatic Conflict Detection and Resolution (ACDR):

- a. Click **Edit** next to the schema for whom you want to configure ACDR.
- b. In the Edit table mapping panel, select Automatic Conflict Detection and Resolution.
- c. For Timestamp, select whether the **Latest** change or **Earliest** change takes precedence.
- d. Select **Delta Resolution** if the changes made must be combined to resolve the conflict, and then select the columns to use. For example, updates made to product inventory.
- e. Click **Apply**.

Warning

GoldenGate Studio doesn't support the addition of new tables, nor the change of ACDR type, after the active-active pipeline starts. Unless absolutely necessary, you can either:

- Create, configure, and start a new pipeline with the new tables added.
- In the GoldenGate Studio console:
 - a. Stop the pipeline.
 - b. Create a new table externally.
 - c. Under **Mapping**, expand the schema and select new tables.
 - d. Under **Options**, in **Advanced Options** and under **Replicat**, select **DISCARD** for **Actions upon DML Error**.
 - e. Save the pipeline configuration and then restart the pipeline.

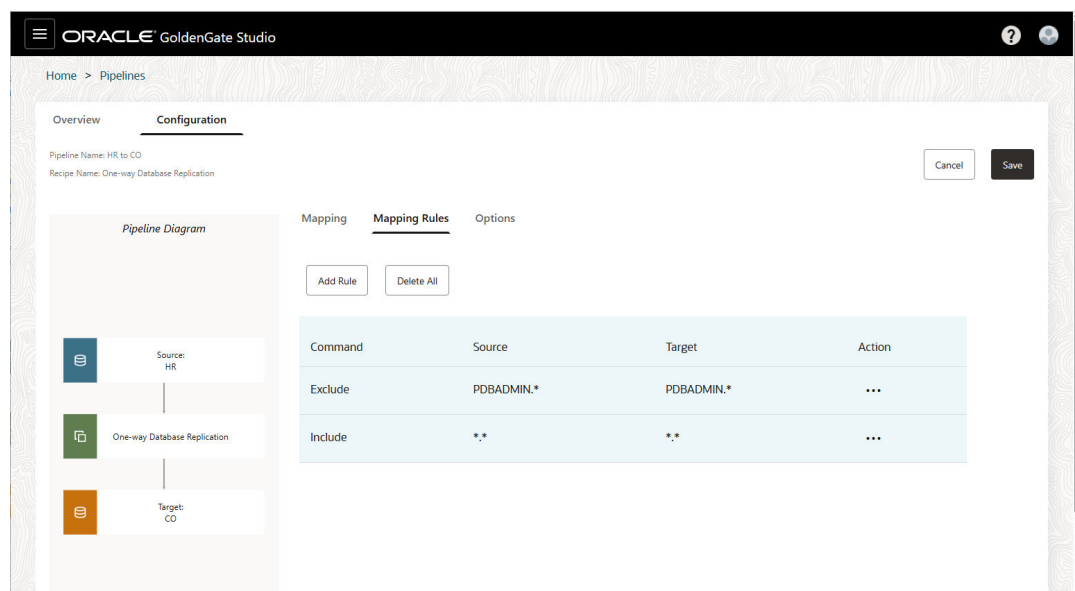
Note

ACDR isn't automatically enabled for tables without keys.

Note

If you stop a pipeline while ACDR is enabled or if the Enable ACDR step generates an error, then ACDR will not be enabled for selected tables.

4. Under **Mapping Rules**, you can review, add, delete, and reorder rules.

**Additional Considerations:**

- Exclude rules take precedence over Include rules.
- To delete a rule, click **Actions** (ellipsis icon) and select **Delete**.

- To reorder a rule, click **Actions** (ellipsis icon) and then select either **Increase priority** or **Decrease priority**.
 - To add a new rule, click **Add rule**. You can use the following special characters when constructing rules:
 - Asterisk (*) as a wildcard for any number of characters
 - Underscore (_)
 - Space ()
 - Double quotes (") to enclose schema or table names that include spaces or when case sensitivity is required.
 - Individual rules take precedence over group rules.
 - **Delete all** removes all rules in the list.
5. Under **Options**, you can configure a limited set of GoldenGate parameters:
- **Initial Load of existing schemas and/or tables**

Note

- If you use a **Database Link** for Initial Load, you must provide the Source Wallet URI parameter value.
- If you use **Object Storage** for Initial Load, you must provide the Object Storage Bucket URI value.

- **Replicate Data Definition Language (DDL)**
- **Advanced options** for Initial Load (Data Pump), Extract, or Replicat

Note

Refrain from making changes to the underlying parameter file as it affects the ability to manage the pipeline. Likewise, if using the GoldenGate Studio console, refrain from changing the Replicat type.

6. Click **Save** to save your configuration settings.
7. After configuring the pipeline, click **Start** to run it.
- You can review the initialization procedure, the status and progress of each step in the replication process, and how much time it takes for each step to complete.
8. After initialization completes, the **Runtime** page displays data capture operations on the source database replicated to the target.

The pipeline runs continually until it's stopped.

Next Steps

After your pipeline is created, configured, and running, learn to [Manage Pipelines](#).

Configure Advanced Settings

Explore different advanced settings for GoldenGate Studio.

You can use **Advanced Options** to fine tune your replications. These settings allow you to optimize performance, customize deployment behavior, and manage environment-specific requirements.

Initial Load Advanced Options

When setting up a replication, you can configure advanced options to optimize the **Initial Load** process.

The Initial Load advanced options determine how the data is transferred, handled, and synchronized between the source and target systems.

Setting	Description	Value
Action Upon Existing Tables	Determines how to handle existing target tables during initial load.	REPLACE, TRUNCATE, APPEND, SKIP

Setting	Description	Value
Degree of Parallelism	Number of parallel threads for the Data Pump load. Higher values can speed up loads but increase resource usage. If the number of CPUs is 'n' and degree of parallelism value is less than or equal to 'n' then the degree value is going to be 'n'. However, if the number of CPUs are 'n' but the degree of parallelism value is 'x', which is greater than 'n', then the degree value is	Any positive integer value >= 1.

Setting	Description	Value
	going to be 'x'	
Additional Initial Load (Data Pump) Job Duration	Specifies for how much time jobs will run after the expected completion time for Initial Load. After the assigned time it will automatically time out.	1h
Transfer Medium	Specifies the transfer method for Initial Load.	Database Link, Object Storage, File Storage
Object Storage Bucket URI	Location of the staging bucket for Initial Load files.	https://objectstorage.us-phoenix-1.oraclecloud.com/...

Setting	Description	Value
Target Database SSL Wallet Path	This is the location of SSL Wallet for target database.	/u02/app/oracle/admin/targetdb/wallet See Configure and Download SSL Wallet for Non-Autonomous Database
Source Database SSL Wallet Path	This is the location of SSL Wallet for source database.	/u02/app/oracle/admin/sourcedb/ssl_wallet See Configure and Download SSL Wallet for Non-Autonomous Database
Wait Time for Open Transactions	Duration to wait for open transactions to finish before replication starts.	1h

Setting	Description	Value
Export Directory (Local Shared Storage)	This is Source shared directory location for writing dump files during data pump export.	/mnt/source_exports
Import Directory (Local Shared Storage)	This is target shared directory location for writing dump files during data pump export.	/mnt/target_imports
Actions Upon Expiry	Specifies if there is need to continue or stop if the transactions are open.	CONTINUE, STOP

Note

To get the Wallet Bucket URL from Oracle Cloud Infrastructure (OCI), where Autonomous Database is running, create a bucket in OCI and generate a pre-authenticated read/write URL for that bucket.

Types of Initial Load Transfer Mediums

In GoldenGate Studio, the **Initial Load** process is used to transfer a complete dataset from the source to the target before starting ongoing replication. This ensures both databases are synchronized before Change Data Capture (CDC) begins. GoldenGate Studio offers different transfer mediums for performing the initial load. These transfer mediums are:

1. Database Link

The Database Link method transfers data directly from the source database to the target database using an established database link, without any intermediate storage. This method works best when both databases are in the same network or connected through a stable, high speed link. Since it uses SQL INSERT statements to move data, the process is straightforward but can be slower for large datasets due to SQL execution overhead.

Database Link is less suited for large datasets or cross-region migrations, where latency could significantly slow down the process. It is best used for small to medium sized transfers where simplicity outweighs performance concerns.

2. Object Storage

The Object Storage method stages initial load data in an Oracle Object Storage before importing it into the target database. GoldenGate first exports data from the source into Data Pump files, stores them in the specified bucket, and then imports them into the target. This approach eliminates the need for a direct network connection between source and target, which is suitable for cross region, cloud to cloud, or hybrid cloud migrations.

A direct database connection may be slow or restricted, so the data is staged in Object Storage and securely fetched by the target system. This method is highly reliable for large datasets and supports resumable transfers in case of interruptions. However, it requires additional configuration for bucket creation and wallet authentication, as well as extra storage space for staging files. It is best used when the migration involves large volumes of data across different regions or environments.

3. File Storage

The File Storage method facilitates initial load by exporting source data into disk files on the GoldenGate server. These files are then ingested into the target database. This method is particularly effective when both source and target databases are non Autonomous Database and can access a shared storage layer, such as:

- Network File System (NFS) mounts
- Oracle File Storage Service (FSS)
- Docker volume mapping (for containerized database installations)

By leveraging shared storage, whether on premises or cloud based organizations can achieve high throughput data transfer and maintain control over the staging environment.

This method mirrors the Object Storage approach but is tailored for environments without access to native cloud object storage. By using shared storage, organizations can replicate the reliability and efficiency of object storage in on premises or hybrid setups.

GoldenGate writes extracted data files to the shared location, and the target database reads these files for ingestion. This intermediate staging allows for data validation, auditing, and performance tuning before final load. It's particularly useful in secure environments with strict compliance requirements and high speed LAN connectivity.

This setup ensures fast, secure data transfer, audit-friendly staging, and full control over sensitive financial data.

To know more about initial load processing, refer to the *Precise Instantiation for Oracle Using Initial Load Extract and About Data Replication Components* in Oracle GoldenGate topics in *Oracle GoldenGate Microservices Documentation*.

Support Matrix – Oracle Database Flavors and Initial Load Methods

Learn about the supported Initial Load methods for different Oracle Databases with recommendations.

The matrix below outlines the supported Initial Load methods in GoldenGate Studio for various Oracle Database environments, including Autonomous Database and non Autonomous

Database. These methods applies to all Recipes, including One-way, Active-active, and ZeroETL Recipes. Non Autonomous Database will contain both On-premise and DBaaS (Database as a service which is in Oracle Cloud Infrastructure).

Oracle Databases	Data Pump via Database Link	Data Pump using File Storage	Data Pump using Object Storage	Recommendation
Non Autonomous Database to non Autonomous Database	Yes	Yes	Yes	Choose Database Link for small datasets; Object Storage for large migrations.
Autonomous Database to non Autonomous Database	Yes	No	Yes	Use Object Storage for secure and reliable transfer.
Non Autonomous Database to Autonomous Database	Yes (Private Network)	No	Yes	Prefer Object Storage; use Database Link only if private network connectivity is available.
Autonomous Database to Autonomous Database	Yes	No	Yes	Object Storage is recommended for cross-region or large dataset transfers.

Replicat Advanced Options

Explore the Replicat Advanced Options.

Setting	Description	Values
Action upon DDL Error	Specifies the action to take when a Data Definition Language (DDL) operation fails.	DISCARD, IGNORE, KILL
Action upon DML Error	Specifies the action to take when a Data Manipulation Language (DML) operation fails.	DISCARD, IGNORE, KILL, DEFAULT (RETRY_OPERATION) ABORT_TRANSACTION
Maximum Retry Count	The maximum number of tries can be specified by the users.	0, 1, 2, 3, 4, 5

If **Replicat Auto Restart** option is enabled, you will see the following options:

Setting	Description	Values
Retry Delay	The amount of time (in sec) to pause between discovering that the process has terminated abnormally and restarting the process.	0, 1, 2, 3, 4, 5

Additional Replicat Parameters	This parameter instructs the Replicat process to ignore records that encounter Oracle error and continue processing. These are custom parameters that can be used to handle specific error codes and conditions.	REPERROR (26961, DISCARD)
Failure	The number of times a task or process has failed in the current monitoring window.	0, 1, 2, 3, 4, 5
Max Retries	The maximum number of times the Replicat process will attempt to restart after a failure. This setting works in conjunction with RETRYDELAY.	0, 1, 2, 3, 4, 5
Restart Windows	Defines the time frame within which the Max Retries count is applied.	1m, 2m, 3m

To configure auto start for Replicat, you can use the following parameters:

Parameter	Description	Default Value
replicatAutostartEnable	Enables auto start for the Replicat process	false
replicatAutostartDelay	Delay before starting the Replicat process	5s

Extract Advanced Options

Explore the Extract Advanced Options.

Setting	Description	Values
Source Database timezone	Specifies the time zone of the source database. This is a critical setting for ensuring accurate timestamp replication.	EST, PST, UTC, IST
Additional Extract parameters	This parameter instructs the Replicat process to ignore the records that encounter error and continue processing. These are custom parameters that can be used to handle specific error codes and conditions.	REPERROR (PROCEDURE, DISCARD)

If **Extract auto restart** option is enabled, you will see the following options:

Setting	Description	Values
Max Retries	The maximum number of times the Extract process will attempt to restart after a failure, before it gives up.	0, 1, 2, 3, 4, 5
Retry Delay	The time interval, in seconds, between each restart attempt.	1s, 2s, 3s, 4s

Restart Window	The time frame within which the Max Retries count is applied.	1m, 2m, 3m
Failures	The total number of times the Extract task has failed within the specified Restart Window.	0, 1, 2, 3, 4, 5

To enable auto-start option for Extract, you can use the following parameters:

Parameter	Description	Default Value
extractAutostartEnable	Enables auto start for extract process	false
extractAutostartDelay	Delay before starting extract process	5s

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Manage

Learn to manage GoldenGate Studio deployments, connections, and pipelines.

Manage Deployments

Manage deployments registered in GoldenGate Studio.

Edit Deployments

Learn how to edit deployments in Oracle GoldenGate Studio's user interface.

1. In the navigation menu, select **Deployments**.
2. On the Deployments page, select **Edit** from the Actions menu of the deployment you want to modify.
3. From the **Edit Deployment** dialog box, you can edit the following options for a deployment:
 - **Name**: Name of the deployment.
 - **Hostname**: Hostname or IP address used to connect to the deployment.
 - **Port**: Port number of the Administration Service for the specified deployment.
 - **Username**: User name of the deployment to be connected. This user is the Oracle GoldenGate administrator user. See Authorization in Oracle GoldenGate
 - **Password**: Password of the user account associated with the deployment login credentials.
 - **Use Reverse Proxy**: Enable this option if reverse proxy configuration was implemented for the deployment in Oracle GoldenGate.
4. Click **Test Connection** to check if the deployment connects successfully. If the deployment connects successfully, then the **Next** button is activated.
5. Click **Next**. The Confirmation screen displays the deployment details. You can review the details and if you accept the deployment credentials, click **Save**.

Test a Deployment Connection

Testing the connection ensures that GoldenGate Studio and Oracle GoldenGate can communicate with each other.

You can test a deployment in two ways:

- When you first register the deployment
- When you edit the deployment

After reviewing the deployment connection information, click **Test connection**.

Delete a Deployment

Delete deployments you no longer use.

Before you delete a deployment, check that the deployment is not used in any active pipelines.

To delete a deployment:

1. On the Deployments page, you can select the deployment to delete.
You can also select **Delete** from the deployment's Actions menu (ellipsis).
2. On the Deployment's details page, click **Delete**.
3. In the Delete Selection dialog, confirm that this is the deployment you want to delete, and then click **Delete**.

Manage Connections

Manage connections from the GoldenGate Studio user interface including steps to edit, clone, and delete connections.

View Connection Details

Select a connection from the Database connections page to view its details. On the Connection details page, you can:

- View connection details such as:
 - Connection name, description, when it was created, and when it was last updated.
 - Database type, hostname, port, username, connector, and connection type.
 - Connection role (source or target).
- Edit the connection details.
- Validate the connection details.
- Clone the connection.
- Delete the connection.

Clone a Connection

Check the steps how to clone the database connection.

To clone a connection:

1. On the **Database Connections** page, select the database connection to clone.
2. On the **Connections** page, click **Clone**.
3. Click **Save changes**.

Edit a Connection

To edit a connection:

1. On the **Connections** page, select a database connection to edit. Click **Edit**

2. In the **Edit Connection** panel, review the connection settings, make your updates, and then click **Next** to progress through the **Edit** connection pages. You can edit details like **Database connection name, description, Hostname, Port, Username, Password, Pluggable Database Service Name**.
3. Click **Save changes**.

Delete a connection

Before you delete a connection, ensure that the connection is not currently in use by an active pipeline.

To delete a connection:

1. On the Database connections page, select the connection to delete. You're brought to the connection details page.
2. On the connection details page, click **Delete**.
3. In the Delete connection dialog, confirm that you want to delete the connection, and then click **Delete**.

The Database connections list is refreshed and the deleted connection removed. You cannot undo a delete operation.

Test a Connection

Learn why testing the connection is essential while creating the database connection.

Before you can design, deploy, or manage data replication solutions in Oracle GoldenGate Studio, it's essential to verify that your configured database connections are functioning correctly. Testing the database connection ensures that GoldenGate Studio can successfully communicate with your source and target databases using the specified configuration and credentials. This step helps identify potential connectivity issues early, such as incorrect network settings, authentication problems, or configuration errors, thereby reducing troubleshooting time and ensuring a smooth development and deployment process.

Test Oracle Database and Exadata Database Connection

Follow these simple steps to test Oracle Database and Exadata Database Connection.

1. Select **Oracle Database** or **Exadata** as the **Technology Type**.
2. The next screen will show fields for username, password, hostname, port, and database Type. Enter the **Hostname** and **Port Number** for your Exadata database.
3. Select the **Database Type** and provide the **Pluggable database service name (PDB)** if applicable.
4. Click **Test Connection** to confirm if the connection is successfully working.

Test Autonomous Database Connection

Follow these simple steps to test Autonomous Database connection.

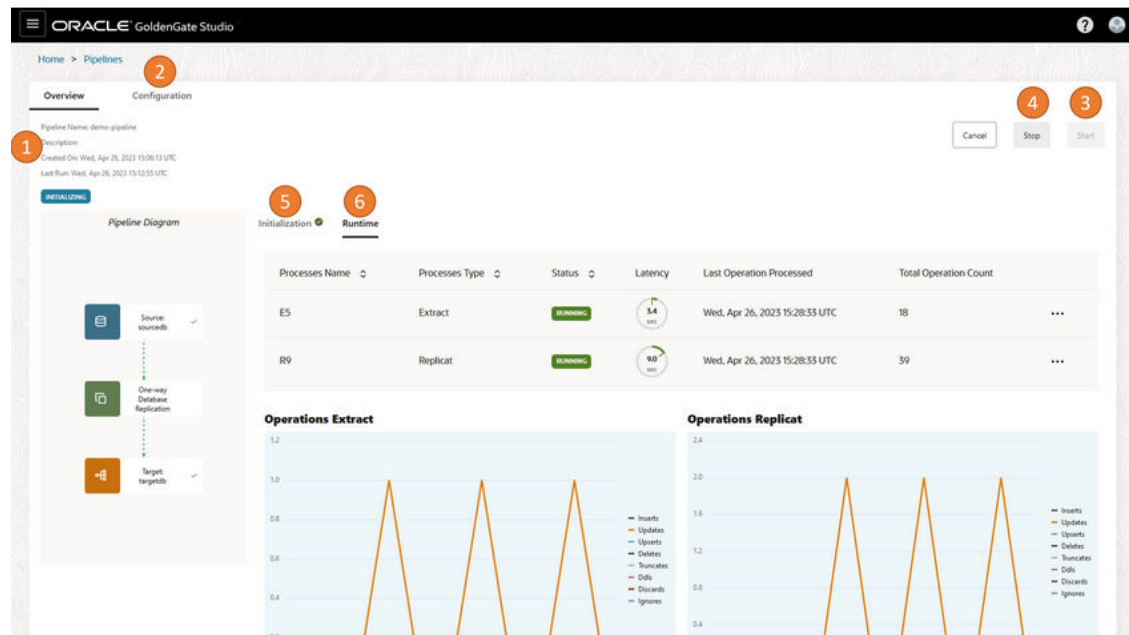
1. In Home page click **Create Connection**. Fill in connection name, optional description and **Technology Types**.
2. Select **Oracle Autonomous Database** as the **Technology Type**.

3. The next screen will prompt you for the **Wallet details**. You will need to provide a username and password. You also need to add the **Wallet File** that contains the credentials and connection information of your Autonomous Database.
4. After filling in the details, click **Test Connection** to verify the connection.

Manage Pipelines

Manage pipelines from the GoldenGate Studio user interface including steps to edit, start, stop, and delete pipelines.

View Pipeline Details



Follow these steps to view pipelines details:

On the **Pipelines** page, select a pipeline to view its details. On the pipeline's details page, click ellipsis (three dots) icon and then click **View**. You can:

- Review pipeline details such as the pipeline name, description, when it was created, when it was last run, and whether it ran successfully.
- Edit the pipeline's configuration, mappings, mapping rules, and advanced options.
- Start and stop the pipeline.
- View the pipeline as it runs in realtime.

Note

The pipeline runs continuously until you click Stop.

- View its initialization steps, the status and logs for each step, and initial load details.

Note

To view message logs for a step, on the **Overview** page, click the ellipsis (three dots) icon, and then select **Log Events**.

Start a Pipeline

Before you can start a pipeline, you must first [Configure a Pipeline](#)

To start a pipeline:

1. On the **Pipelines** page, select the pipeline to start.
2. On the pipeline's details page, click **Start**.
You're brought to the pipeline's initialization page, where you can observe the initial load tasks performed on the target database, as well as the creation and start of Extract and Replicat processes.
3. After the pipeline is initialized, you're brought to the Runtime page, where you can observe data capture operations on the source database replicated to the target database.

The pipeline runs continuously until it's stopped.

Stop a Pipeline

You can only stop a pipeline that is running. Pipelines run continuously until you manually stop them. When you stop a pipeline, GoldenGate Studio stops both the Extract and Replicat processes.

To stop a pipeline:

1. On the Pipelines page, select the pipeline to stop. You're brought to the pipeline's details page.
2. On the pipeline's details page, click **Stop**.

After the pipeline stops, you can click **Start** to restart it. GoldenGate Studio resumes the Extract and Replicat processes, replicating any transactions that occurred while the pipeline was stopped.

Delete a Pipeline

To delete a pipeline:

1. On the Pipelines page, from the Action menu (ellipsis icon) of the pipeline you want to delete, select **Delete**.
2. In the Delete dialog, select whether you want to also delete the GoldenGate configuration.

Note

GoldenGate configuration includes the Extract and Replicat processes created when the pipeline was originally initialized.

3. Click **Delete**.

The Pipeline page refreshes, and the deleted pipeline no longer appears in the list. Once deleted, you can't undo the action.

Manage Users

GoldenGate Studio currently only supports a single user account. Learn how to change the user password.

To change the GoldenGate Studio user account password:

1. Stop the server. Use the following command to identify the server process ID:

```
netstat -tulpn | grep <server port>
```

2. Use the following command to kill the process:

```
kill <process-id>
```

3. Use the following command to change the user password:

```
./setPassword.sh
```

4. Enter the username, oggadmin, when prompted, and then press Enter.
5. Enter the new password when prompted, and then press Enter.
6. Use the following command to restart the server.

```
./run-studio.sh
```

5

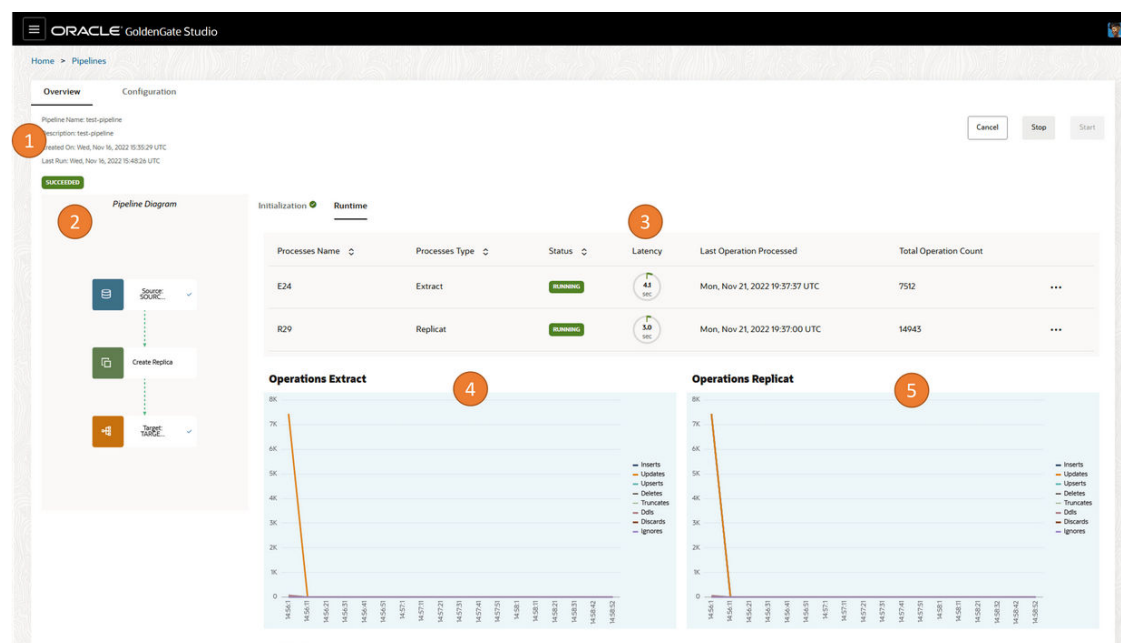
Monitor

Learn to monitor Oracle GoldenGate Studio processes and how to use the information reported.

GoldenGate Studio provides a graphical interface for designing, deploying, and managing data replication solutions. Monitoring pipelines is a critical aspect of ensuring your data integration projects run efficiently and reliably.

Monitor Pipelines

Monitor your pipelines to ensure that your data replication processes are running smoothly without lag. Use the tools available to troubleshoot or diagnose issues you may encounter.



When you select an active pipeline from the **Pipelines** page, the pipeline's **Runtime** page appears. This page displays the following details:

1. Basic pipeline information, including the pipeline's name, description, created date, and run date.
2. A realtime visual pipeline diagram, that updates as you make changes to the pipeline configuration.
3. Information about the pipeline processes, including process names, process types, their statuses, their latency, when their last operation was processed, and their total operation count.
4. Log events, reports, latency graphs of processes.

5. Operations' Extract graph, showing inserts, updates, upserts, deletes, truncates, DDLs, discards, and ignores over time.
6. Operations' Replicat graph, showing inserts, updates, upserts, deletes, truncates, DDLs, discards, and ignores over time.
7. (Not shown) A list of critical events, along with their codes, when they occurred, their severity, and message details.

For each process, you can access the following when you open the ellipsis (three dots) menu:

- View log events
- Access the Oracle GoldenGate Administration Service web interface
- Download reports
- Download latency details

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Troubleshoot

Learn about various troubleshooting tasks during advanced operations.

Configure Log Levels for Server and Performance Logs

GoldenGate Studio allows you to set up different log levels when accessing the GoldenGate Studio Server and Performance logs using logging properties.

Perform the following steps To enable logging at different levels:

1. Before setting up the log levels using the .properties files, you must set up the `LOGGER_FORMAT` environment variable. This environment variable is required for the system to determine the format in which the log needs to be generated. You can specify the value of this variable as `TEXT` or `JSON`, as needed.

Run the following command to set the environment variable:

```
export LOGGER_FORMAT=JSON/TEXT
```

2. Navigate to the `studio_install_path/config/logging.properties` for `TEXT` format or the `studio_install_path/config/logging-json.properties` for `JSON` format.
3. Edit the following properties in the .properties file:

```
.level=FINE
java.util.logging.FileHandler.level=FINE
oracle.cloud.ggfe.log.PerformanceFileHandler.level=FINE
oracle.cloud.ggfe.level=FINE
oracle.cloud.ggfe.orchestrator.connectors.gg.services.level=FINE
```

You can also change the log level for specific classes or packages. The following examples show the modification of log levels for the Helidon and third-party libraries:

Example 1:

```
# Quiet tracing
io.helidon.microprofile.tracing.level=SEVERE
io.helidon.microprofile.openapi.level=SEVERE
io.helidon.tracing.tracerresolver.level=SEVERE
```

Example 2:

```
# Persistence and Jersey
org.eclipse.persistence.level=INFO
org.glassfish.jersey=INFO
org.glassfish.jersey.server.level=INFO
```

Retrieve the Initial Load Log Files

Retrieve the initial load log files depending on the transfer medium and type of database.

The following table describes how to determine the location of the initial load log files and access them, depending on the type of database and the transfer medium:

Transfer Medium	Database	Action
Database Link	Target database, non-Oracle Autonomous Database	1. Use the following query to locate the IMPDAT*.log file from the ORACLE_BASE directory of target database. <pre>SELECT directory_path FROM dba_directories WHERE directory_name='ORACLE_BASE'</pre> 2. View or Copy IMPDAT*.log files from the ORACLE_BASE directory of target database.
Local Storage	Source database	1. Use the following query to locate the EXPDAT*.log file from the ORACLE_BASE directory of the source database. <pre>SELECT directory_path FROM dba_directories WHERE directory_name='ORACLE_BASE'</pre> 2. View or Copy EXPDAT*.log files from the ORACLE_BASE directory.

Transfer Medium	Database	Action
Local Storage	Target database	1. Use the following query to locate the IMPDAT*.log file from the ORACLE_BASE directory of target database. <pre>SELECT directory_path FROM dba_directories WHERE directory_name='ORACLE_BASE'</pre> 2. Copy IMPDAT*.log files from the ORACLE_BASE directory of target database.
Object Storage	Source database, Non-Oracle Autonomous Database	1. Use the following query to locate the EXPDAT*.log file from the ORACLE_BASE directory of the source database. <pre>SELECT directory_path FROM dba_directories WHERE directory_name='ORACLE_BASE'</pre> 2. Download EXPDAT*.log from ORACLE_BASE directory.
Object Storage	Source Database, Oracle Autonomous Database	Download EXPDAT*.log from the Bucket URI.
Object Storage	Target database, non-Oracle Autonomous Database	1. Use the following query to locate the IMPDAT*.log file from the ORACLE_BASE directory of target database. <pre>SELECT directory_path FROM dba_directories WHERE directory_name='ORACLE_BASE'</pre> 2. Download IMPDAT*.log from the ORACLE_BASE directory.