Oracle® Database

Oracle GoldenGate Microservices Architecture Solutions

23ai
G18586-01
May 2025

Oracle Database Oracle GoldenGate Microservices Architecture Solutions, 23ai

G18586-01

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Preface

The *Oracle GoldenGate Microservices Architecture Solutions* guide offers comprehensive architectural replication blueprints tailored to meet specific business requirements. These blueprints facilitate seamless data replication across both homogeneous and heterogeneous systems, enhance real-time data accessibility, and optimize workload distribution for improved efficiency.

Audience

This guide is intended for developers, database users, and administrators who are responsible for installing, deploying, and configuring Oracle GoldenGate. It is assumed that readers are familiar with web technologies, low code development, and scripting. A general understanding of Windows and UNIX platforms is required.

Documentation Accessibility

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Access to Oracle Support

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Related Information

Oracle GoldenGate Documentation

Oracle GoldenGate for Distributed Applications and Analytics

OCI GoldenGate

Oracle Database High Availability

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, such as "From the File menu, select **Save**." Boldface also is used for terms defined in text or in the glossary.
italic `*italic*`	Italic type indicates placeholder variables for which you supply particular values, such as in the parameter statement: `TABLE *table_name*`. Italic type also is used for book titles and emphasis.

Convention	Meaning
`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 exte`, `ADD EXTRAIL ea`.
{ }	Braces within syntax enclose a set of options that are separated by pipe symbols, one of which must be selected, for example: {*option1* | *option2* | *option3*}.
[ ]	Brackets within syntax indicate an optional element. For example in this syntax, the `SAVE` clause is optional: `CLEANUP REPLICAT` *group_name* [, `SAVE` *count*]. Multiple options within an optional element are separated by a pipe symbol, for example: [*option1* | *option2*].
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: • Extract: ext. Usage with location: `extn`, where ***n*** indicates 'north' compass direction. • Replicat: rep. Usage with location: `repn`, where ***n*** indicates 'north' compass direction. • Distribution Path: `dp`. Usage with location: `dpn`, where ***n*** indicates 'north' compass direction. • Checkpoint table: `ggs_checkpointtable` • Trail file names: e or d depending on whether the trail file is for the Extract or distribution path. Suffix derived in alphabetical order. Usage for an Extract trail file: `ea`, `eb`, `ec`. • 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`.

1

About Oracle GoldenGate Solutions

Oracle GoldenGate provides advanced level capabilities for unidirectional, bidirectional, and multi-directional replication, live reporting, zero downtime migration (ZDM), flexibility, real-time data warehousing, load balancing, and many other business solutions.

Oracle GoldenGate Microservices Architecture supports multiple methods to monitor and administer Oracle GoldenGate. These methods include the web interface for a graphical interaction with Oracle GoldenGate, the Admin Client for a command line interface, and REST APIs for building your own user interface or automation of Oracle GoldenGate.

You can use Oracle GoldenGate for replication between relational databases and non-relational databases. Oracle GoldenGate also provides extended capabilities to apply different data management approaches such as Centralized data management (implemented using Data Mesh) and Decentralized data management (implemented using Data Fabrics).

This guide describes the implementation of these solutions using automation scripts for REST API commands using cURL and Admin Client scripts using OBEY commands, to set up various business scenarios and test Oracle GoldenGate Microservices features.

2

Flexibility Solutions in Oracle GoldenGate Microservices

Subset of Data
By replicating only relevant subsets of data, filtering can enhance replication speed and decrease the load and optimize performance on both source and target databases. The target table can be a subset of the source table, meaning that only specific rows or columns are replicated based on certain criteria.

- **Reducing Data Duplication / Data Reduction**: Filtering and mapping can help prevent unnecessary duplication of data, maintaining cleaner datasets in the target environment. This is also minimizing storage costs and improves replication performance.
- **Data Compliance and Security**: Filtering can help ensure that sensitive or personally identifiable information is not replicated to less secure environments, helping organizations meet compliance regulations.

Schema Adaptation
Mapping allows for changes in data structure, enabling the target database to have a different schema than the source. This is particularly useful when integrating with legacy systems or when the target system requires a different format.

- **Schema Compatibility**: The target table should have a compatible schema with the source table to ensure that the data can be properly replicated. This includes data types and constraints.
- **Indexes and Constraints**: While the target table can have different indexes or constraints, it's crucial to consider performance and data integrity when designing the target schema.
- **Partitioning**: In some cases, the target may use a different partitioning scheme, which can help optimize performance for specific queries.

Data Enrichment
Transformations can enhance the data during replication by adding calculated fields or converting data types, ensuring that the data is more useful for the target application.

Consistency with Business Logic
Transformations can enforce business rules and logic, ensuring that the replicated data aligns with the operational requirements of the target system.

Improved Maintenance and Management
By tailoring the data through filtering and transformations, the target database can be optimized for specific use cases, leading to easier maintenance and management over time. Incorporating filtering, mapping, and transformations allows organizations to tailor the replication process to their specific needs, enhancing efficiency, security, and data usability.

Facilitating Analytics
Transforming data into a more analyzable format can enhance reporting and analytics capabilities in the target database, making it easier for users to derive insights.

Multi-System Integration
When replicating data to multiple systems, mapping and transformations can facilitate compatibility between different databases, allowing for smoother integration.

3
Replicate Between Relational Databases

Learn about the commonly used Oracle GoldenGate Microservices Architecture solutions when replicating between two or more relational databases.

Oracle GoldenGate supports Oracle and non-Oracle relational databases for replication. You can view a list of the supported databases for the current release from the certification matrix:

https://www.oracle.com/integration/goldengate/certifications/.

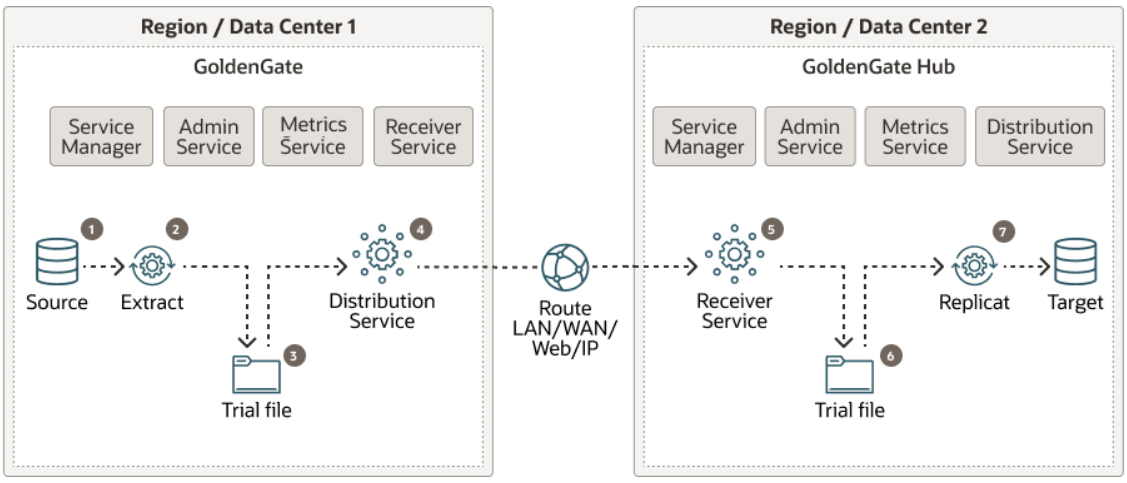
Data Replication Models

Oracle GoldenGate can be installed on the local server as the data source or target, or on a remote server as source or target. Oracle GoldenGate processes can connect to the database by configuring a network connection from Oracle GoldenGate to the database. For example, in Oracle or non-Oracle database server, the connection from the Extract, Replicat, and Microservices are made using Database Network, and can run on a separate server from the database server.

This section covers different aspects of setting up a local deployment when installing Oracle GoldenGate or remote deployment, when installing Oracle GoldenGate on a hub.

Replication Using Local Deployment

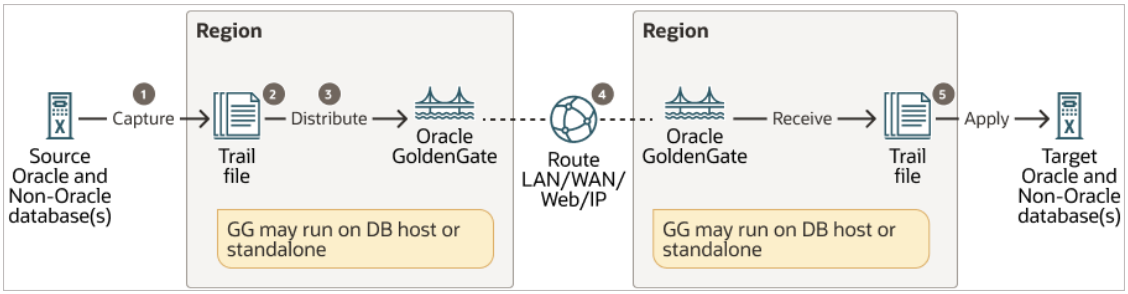
When replicating using a local deployment, the Oracle GoldenGate instance runs on the database server using a local connection to the database, as shown in the following diagram.



In this diagram, two Oracle GoldenGate deployments are set up on two different database servers, which are connected over the network. Consider, Data Center 1 as the source and Data Center 2 as the target. Both the deployment are local to their respective database server.

However, the databases reside in different regions or servers and use a Distribution Service / Receiver Service pair to send the trail files across the network.

The following diagram displays the workflow of an Oracle GoldenGate deployment in a database server within a local hub.



This diagram is described using the following points:

- 1: Capture of committed transactions that can be filtered as they occur by reading the transaction keys)
- 2: Trail is sent using canonical, secure and wire protocol for data transaction and events.
- 3: Distribution/Receiver Services send and receive data across the service mesh.
- 4: Route transactions are compressed, encrypted for routing to targets
- 5: Delivery applies data with transaction integrity

Replication Using a Hub

When replicating using a hub configuration, the Oracle GoldenGate instance runs on an individual Server, Instance (like a compute instance), or Host and connects remotely to the database. This case is used mostly when you want to limit the overhead of Oracle GoldenGate on the source or target databases, or the database environment does not allow the software to be installed locally on the database server.

Most remote Extracts, except for SQL Server, can tolerate up to 80ms round trip ping time between the source database and the server where the Extract process is running. This provides a lot of flexibility in deciding where the server running the Extract process can be physically located. This feature enables capturing remotely in mutiple scenarios, especially for cloud databases. For example, it allows capturing remotely where the Extract process is running on a compute node in the same region, or in an on-premises data center, or in another region or cloud provider providing the network ingress and the egress is configured to allow for the client connection.

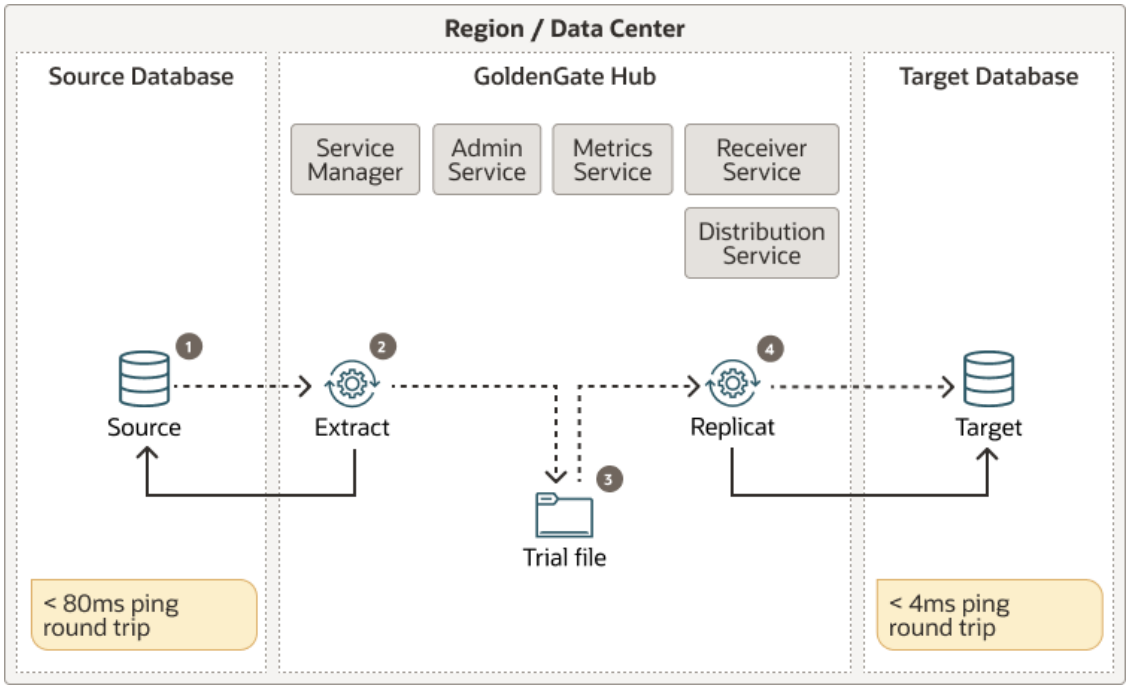
For best performance, Oracle recommends running the Extract process as close to the source database as possible.

Remote Replicats are highly dependent on low network latency because each network operation requires an acknowledgement before the next can be issued. Oracle recommends that the round-trip ping time between the server running the Replicat process and the target database be as low as possible, and typically any values higher than 4 ms will increase the Replicat lag.

In hub models, both the Extract and the Replicat for the same replication stream are deployed on the same server, so, there is no need for a Distribution Path. The Extract writes to a local trail file, and the Replicat reads from that same trail file. However, in some topologies, a hub

might be deployed close to the source database, with an additional hub located near the target database. In these cases, changes are routed through the Distribution Path from the source hub to the target hub.

In the following diagram of a hub deployment, the Extract and Replicat processes operate from the same Oracle GoldenGate server and connect remotely to the source database.

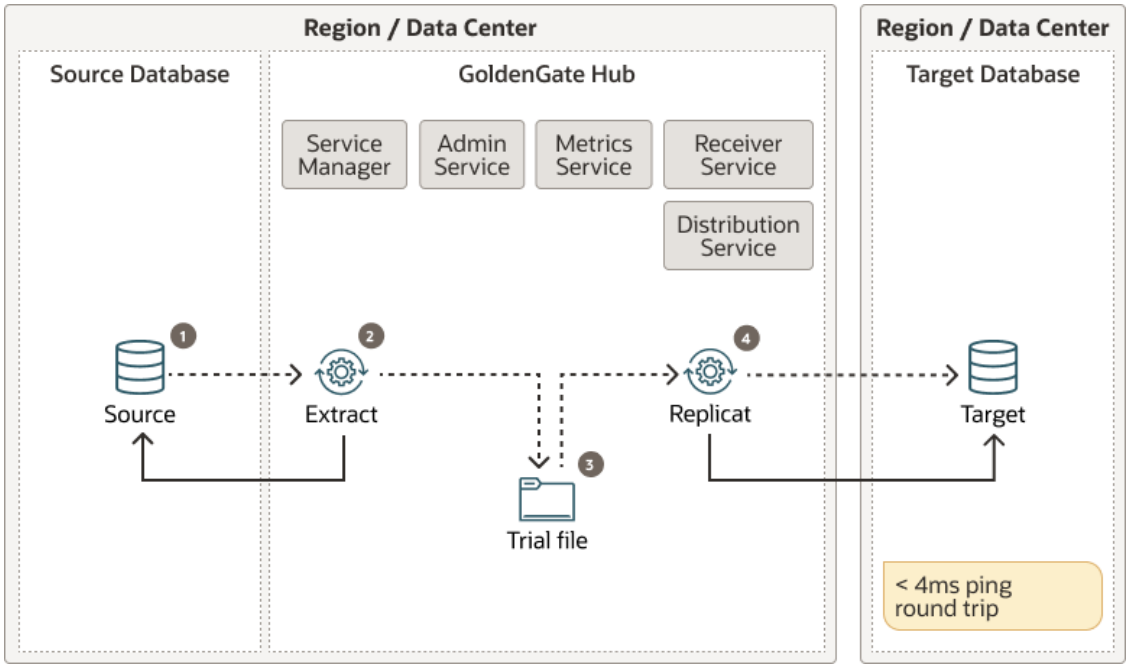


This configuration can have multiple Oracle GoldenGate installations with multiple deployments managing a fleet of replication streams with similar or different topologies and use cases.

Replication Using a Hybrid Model

Replication in a hybrid deployments with Oracle GoldenGate can be done by mixing local and hub deployments together and connect different deployments through Distribution Paths.

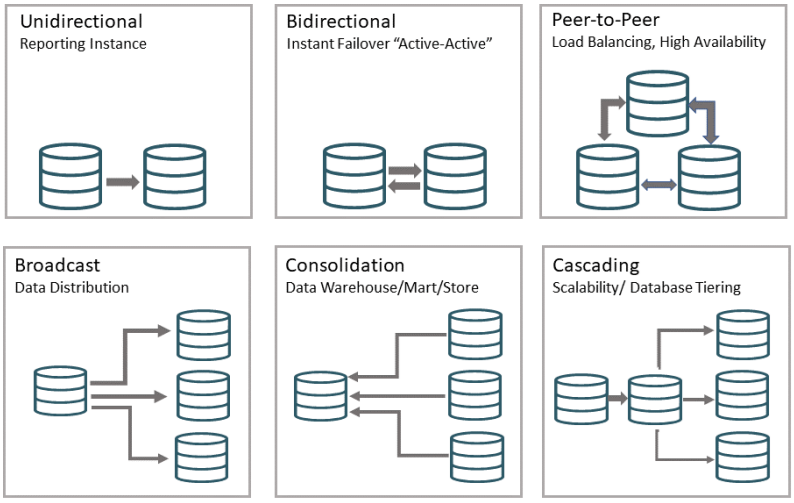
In the following hybrid deployment, Oracle GoldenGate software is installed locally on the source database and connects remotely to the target.



Solutions for Data Replication in Different Relational Database Topologies

Learn about different Oracle GoldenGate topologies configured for different databases.

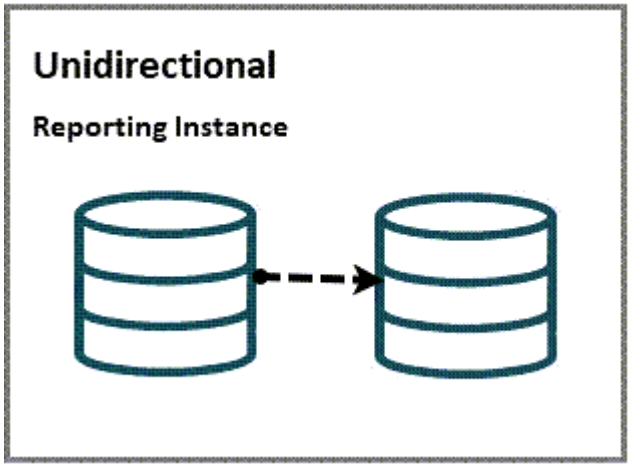
Each topology may be suited to particular use cases, although some use cases may be applicable across multiple topologies. Each topology provides a blueprint framework for configuration and is used in real-world environments with variations and combinations of these topologies. With Oracle GoldenGate's flexibility, the configuration possibilities are virtually limitless.



For full information about processing methodology, supported topologies and functionality, and configuration requirements, see Prepare section in *Oracle GoldenGate Microservices Documentation*.

Unidirectional

The most basic Oracle GoldenGate configuration is a one-to-one configuration that replicates in one direction: from a source database to a target database that is used only for data retrieval purposes such as reporting and analysis.



Oracle GoldenGate supports like-to-like or heterogeneous transfer of data, with capabilities for filtering and conversion on either system in the configuration (support varies by database platform). Oracle GoldenGate supports different reporting topologies that enable you to custom-configure the processes based on your requirements for scalability, availability, and performance. This section contains things to take into consideration when choosing a reporting configuration.

See the Reporting sample script for this scenario to test the reporting and analysis feature of Oracle GoldenGate.

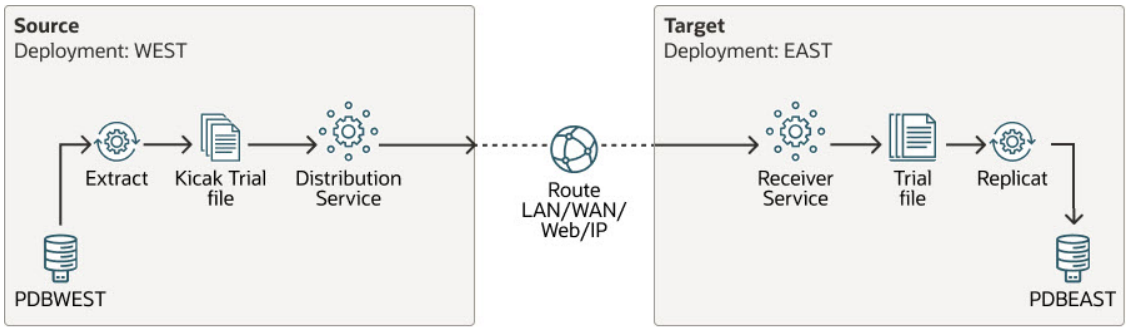
Live Reporting in a Unidirectional Replication Environment

Oracle GoldenGate supports homogenous and heterogeneous transfer of data, with capabilities for transformation, filteration, and conversion on either or both systems in the configuration (support varies by database platform). Oracle GoldenGate supports different reporting topologies that enable you to customize the configuration of processes, based on your requirements for scalability, availability, and performance.

Here are some guidelines for choosing a reporting configuration:

- It is recommended that you use a secondary database to run reports because it reduces the load on the application database, allowing more resources to be available on the replicated database. Another advantage of using Oracle GoldenGate for offloading reporting to a secondary database is that the secondary database can be optimized specifically for those reports.
- Create additional indexes, use materialized views to replace common joins, use modified storage parameters, or other database tools to ensure the reports run at an optimal speed.

- Oracle GoldenGate transformation routines can be used to flatten or modify the structure of the data to improve the performance of the reporting server. This becomes popular in a data fabric architecture, which allows the consumer of the real-time data in many open-source Data Warehouse solutions although the original transactional data only exists in traditional/legacy databases. See Consolidation to know more about using additional databaess for generating reports.



See the Reporting sample script for this scenario to test the reporting and analysis feature of Oracle GoldenGate.

Zero-Downtime System, Database, and Application Upgrades and Migrations

Zero Downtime operations are used to eliminate downtime for upgrades and migrations and fallback strategies. This includes migration of the database from one database technology to another, for example migrating from PostgreSQL to Oracle, or migration of a database into a cloud environment or between cloud vendors, or migration from one operating system to another. The same replication pattern can also be used to eliminate or minimize the outage for upgrades, including application upgrades where the database structure needs to change, or database and operating system upgrades and patches.

Oracle GoldenGate's adaptability and flexibility allows it to replicate between different databases, database versions, operating systems, and even between tables with different structures. While many zero downtime migrations and upgrades using Oracle GoldenGate can be configured unidirectionally, there are some situations where it is configured bi-directionally. Oracle recommends setting up failback replication stream from the new environment to the old environment to prevent data loss. If there is an issue with the new environment, then the database and Oracle GoldenGate administrators can switch users back to the old environment without any loss of data. This is accomplished by configuring a reverse replication stream from the new environment back to the old database as covered in Bidirectional Replication Using Live Standby Database .

See Best Practices for Logical Database Migration.

Also see Learn About Migrating with Oracle GoldenGate to know more.

Maintain Lower-Level Environments

Oracle GoldenGate can be used to populate lower-level environments, like QA, development, pilot, and user acceptance databases. Depending on the business needs, these environments are created as full copies of production, for example, for performance testing or pilot environments, while others will be a fraction of the data, such as for development purposes.

If only a subset of data is needed, then the Oracle GoldenGate administrator can configure `FILTER` conditions in the `TABLE` statements in the Extract process. The administrator must pay attention to lookup tables, which are typically not filtered, and normal user tables, which are filtered.

In applications with foreign keys, this can be easier compared to applications without foreign keys. If the application does not contain foreign keys, then you will need to work with the application team to determine the appropriate filters to set for replicating fractional data.

Additionally, there may be a need to obfuscate or mask certain columns. This can be done using Oracle GoldenGate's built in transformation routines, including `SQLEXEC` / `DBFUNCTION` calls, or by triggers on the target tables.

Bidirectional

Bidirectional replication can be done using an active-passive configuration where a Live Standby database is used or using an active-active configuration where the source and target databases are sending and receiving data actively.

Comparing Active-Active and Active-Passive Configurations

A common use case for Oracle GoldenGate is High Availability to reduce the downtime that occurs during planned or unplanned outages.

When implementing Oracle GoldenGate for this use case, you can configure active-active replication, where two or more databases are configured for read and write traffic from the application, or configure active-passive (also called Live Standby), where read and write traffic for the application should only connect to a single database at a time. This also ties in closely with Oracle's Maximum Availability Architecture patterns of Gold and Platinum.

Using Oracle GoldenGate this way can reduce the Recovery Time Objective to zero for nearly any kind of outage.

Use the following guidelines to decide which method you should use for your application.

Both methods are configured similar to a unidirectional topology, where a replication stream is configured from a source to a target. However, the administrator will also configure replication from the target back to the source. This means that loop detection needs to be considered for any Extracts and Replicats involved in bidirectional replication. To learn about loop detection, see Enabling Bi-Directional Loop Detection. It also means that any active-passive or active-active topology can only be configured when the databases are certified for both capture and delivery. See the certification matrix to learn about the supported operating system and databases.

Active-Active High Availability Purposes

In an active-active environment you can configure bidirectional replication and the application can connect to any database.

- During unplanned outages, users can be immediately connected to another database in the active-active environment.
- For planned outages, you can slowly move users (or drain connections) over to another database prior to taking the server offline for a better user experience.

In both cases the Recovery Time Objective (RTO) is zero because the other database is already open for both read and write activity.

Oracle GoldenGate replication is asynchronous, so there could be a situation where two transactions modify the same row at the same time on different databases. When the system attempts to replicate these changes to the other server, it can create a conflict. To resolve these conflicts, administrators need to be configure Oracle GoldenGate using the `COMPARECOLS` / `RESOLVECONFLICT` (CC/RC) options or using the Automatic Conflict Detection and Resolution (ACDR) feature, which is only available in Oracle database. Both methods have some requirements and recommendations to ensure smooth operation and eventual consistency of your data.

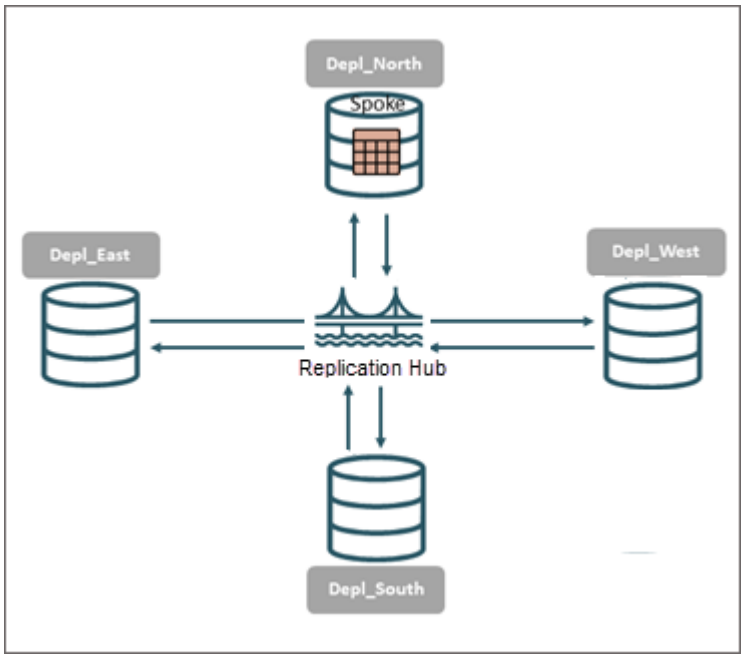
Oracle GoldenGate can support multiple active-active topologies including Data Mesh and Hub and Spoke models.

In a data mesh model, all databases are connected to each other. A mesh style works well when you have just a few databases, usually four or less.

GoldenGate Stream Analytics implements a data mesh platform, allowing you to visually construct data pipelines that perform continuous ETL or advanced analytics on any data that is moving in realtime windows that can be as small as 1 milliseconds. Using Stream Analytics, you can easily ingest data events from all database using Oracle GoldenGate.

See About Stream Analytics to know more.

In a hub and spoke model, each read-write database is a spoke, and sends data to the hub, the hub then sends data to all the other spokes. The hub-and-spoke model works better for large number of deployments, but due to the extra hop at the hub, the latency is higher which can cause additional conflicts.



For more information about configuring active-active replication with Oracle GoldenGate, refer to this technical paper: https://www.oracle.com/a/ocom/docs/ogg-best-practices-active-active.pdf.

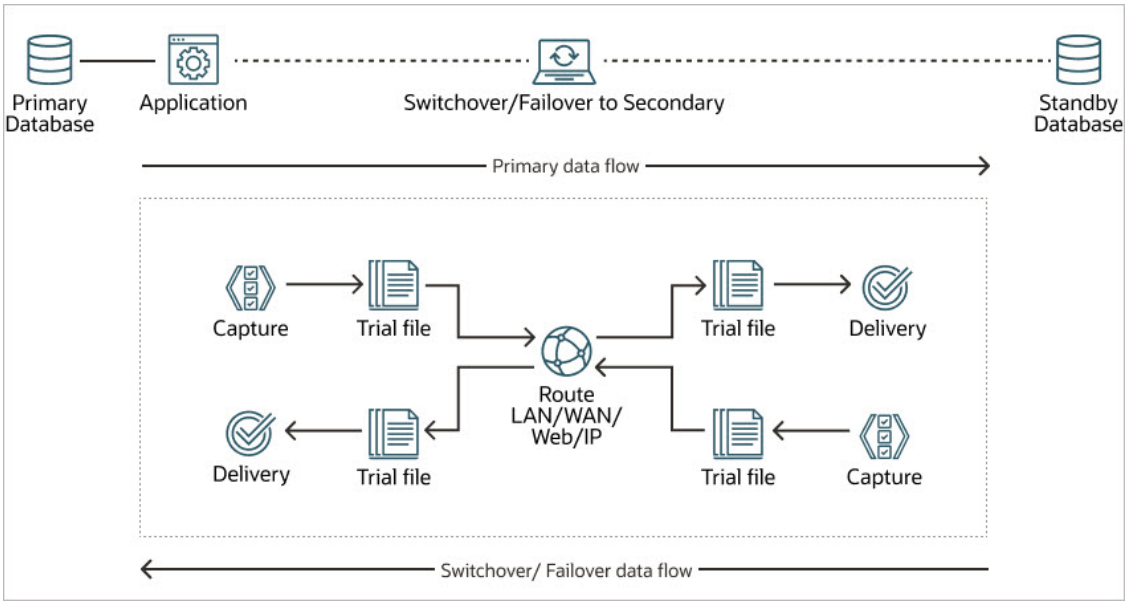
Active-Passive for High Availability Purposes

In an active-passive environment, a bidirectional replication is configured but the application is only connected to one server at a time. In the event of an outage, you cannot connect to the other database until the Oracle GoldenGate Replicat has applied the last transaction, which means the RTO will be equal to the Oracle GoldenGate lag. Typical lag for Oracle GoldenGate is about 4-7 seconds, so this can achieve very low RTO values and because write activity will only happen on one database at a time, there is no need to worry about data collisions. Active-passive doesn't have the application and schema restrictions that exist in an active-active application, so it can be used on third party applications like Siebel and PeopleSoft. A typical active-passive implementation is one passive database for each active database.

If your application can tolerate a few seconds of downtime (RTO of about 4-6 seconds) then it is recommended to use the active-passive architecture. It's easier to implement and maintain, has fewer application and table dependencies, and will work for package applications. However, if you truly need an RTO of zero, then active-active should be the architecture.

Bidirectional Replication Using Live Standby Database

Oracle GoldenGate supports an active-passive bi-directional configuration, where Oracle GoldenGate replicates data from an active primary database to a full replica database on a live standby system that is ready for failover during planned and unplanned outages.



In this configuration, there is an inactive Oracle GoldenGate Extract group and an inactive Distribution Path on the live standby system. Both these groups remain stopped until just before user applications are switched to the live standby system in a switchover or failover. When user activity moves to the standby, those groups begin capturing transactions to a local trail, where the data is stored on disk until the primary database can be used again.

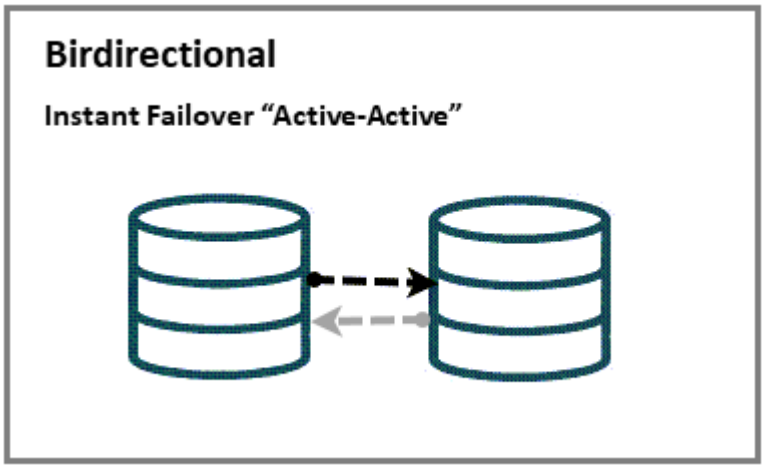
In case of a failure of the primary system, the Oracle GoldenGate Microservices and Replicat processes work in conjunction with a database instantiation taken from the standby to restore parity between the two systems after the primary system is recovered. At the appropriate time, users are moved back to the primary system, and Oracle GoldenGate is configured in ready mode again, in preparation for future failovers.

Advantages of Using Live Standby Database

- Live Standby is used for an immediate fail-over solution that can later re-synchronize with your primary source.
- It helps eliminate downtime and data loss due to unplanned outages and enables continuous availability, with no geographic distance constraints. Oracle GoldenGate moves changed data from primary database to one or more live standby databases so that the applications have a reliable failover system with up-to-date data that they can immediately switchover to. There is no database recovery process required because the live standby database is already open for read and write activity. Oracle GoldenGate will isolate corrupt data during the replication process to make sure the live standby database is reliable and available when it is needed.
- Oracle GoldenGate allows the standby database to be open and accessed by users, so it does not have to sit idle and can be used for reporting or testing. This feature directly boosts the ROI.

Bidirectional Replication Using Active-Active Configuration

Oracle GoldenGate enables bidirectional data movement between two or more databases that actively support an application, with no geographic distance constraints.



The active-active solution allows data updates and changes ("write" activity) to occur on two or more active databases supporting live applications. Oracle GoldenGate synchronizes the two active databases by replicating the data between each at a logical level and allows load distribution to improve system performance. In the case of an outage of one system, there is no downtime for the end user because the other active system continues with operations.

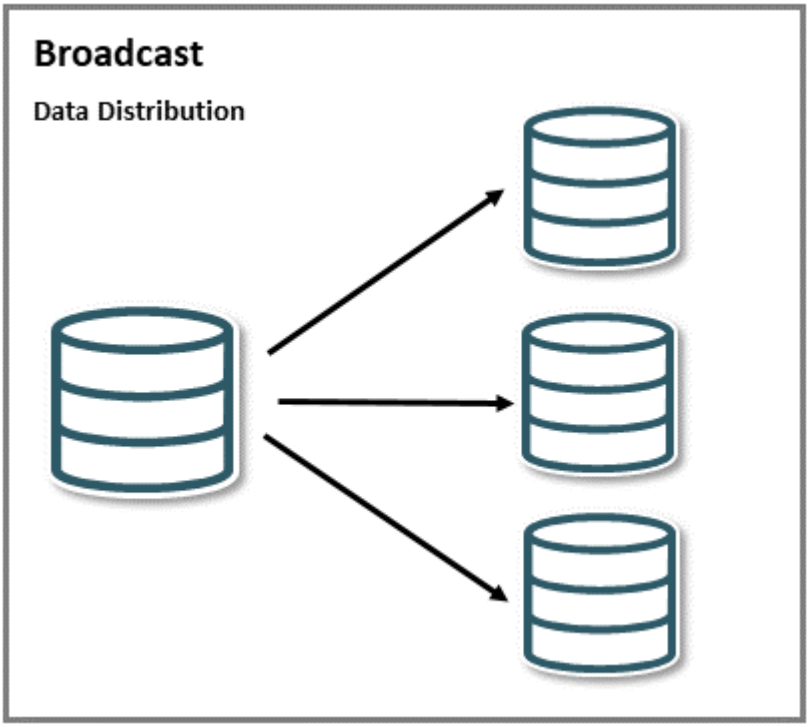
Considering that Oracle GoldenGate is an asynchronous solution, conflict management is required to ensure data accuracy in the event that the same row is changed in two or more databases at (or about) the same time. Oracle GoldenGate provides capabilities to detect and resolve conflicts. A variety of active-active scenarios can be supported – depending on the desired implementations. Oracle GoldenGate provides these active-active solutions for both High Availability as well as Zero-Downtime upgrades and migration projects.

For a sample automation script to set up an active active data replication, see Bidirectional Replication Using Active-Active Configuration.

Also see Design Different Topologies with Oracle GoldenGate 23ai to set up a test environment and use these automation scripts.

Broadcast

A data distribution configuration is a one-to-many configuration. Oracle GoldenGate supports synchronization of a source database to any number of target systems. Oracle GoldenGate supports like-to-like or heterogeneous transfer of data, with capabilities for filtering and conversion on any system in the configuration although support varies by database platform.

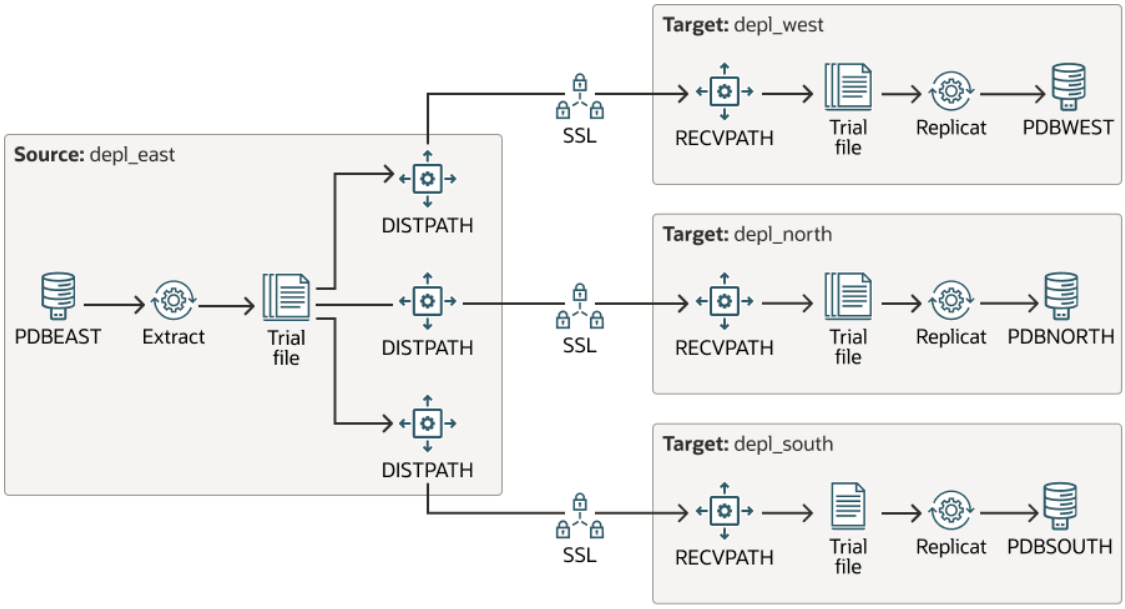


Broadcast topologies can include a mix of unidirectional use cases, including offloading of reporting, replication to a data warehouse, or sending data to a lower level environment. In most cases, administrators configure a single Extract process that writes to multiple trail files. Each trail file is used for a different target database. This reduces the overhead on the source database, and allows each target platform to receive just the data that it requires.

In the following use case, a trail file is replicated across different destinations with the following conditions:

- One trail file is used to replicate across multiple destinations.
- Multiple Distribution Paths are configured to send the trail data with filtered options to specify which tables will be replicated on to a particular destination.

The following diagram displays this configuration where the source deployment, depl_east is sending trail data to three different deployments using DISTPATHS:

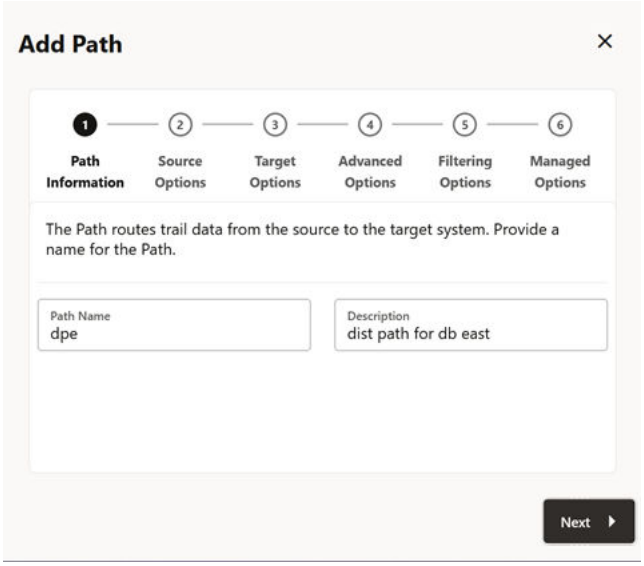


Here's the Extract parameter file:

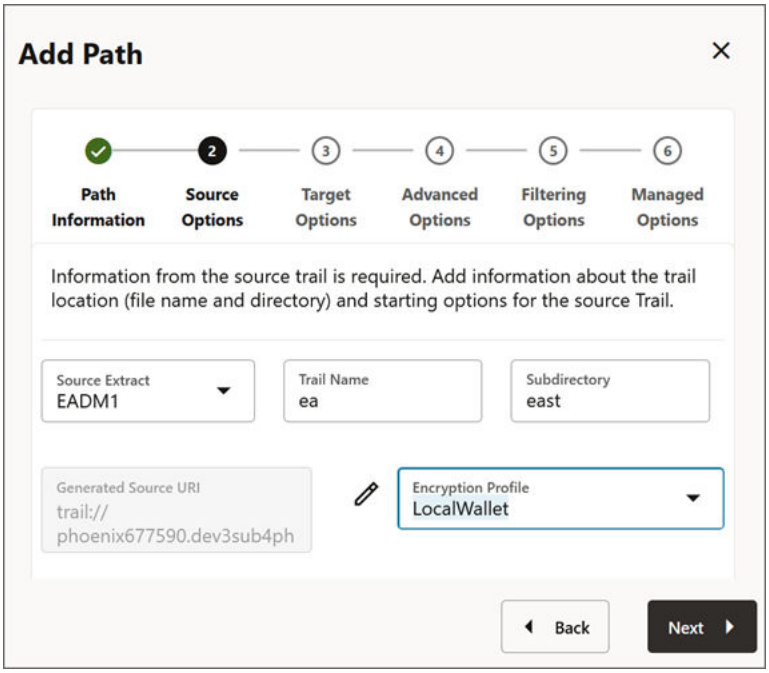
```
EXTRACT exte
USERIDALIAS ggeast
STATOPTIONS REPORTFETCH
EXTTRAIL ea
TRANLOGOPTIONS INTEGRATEDPARAMS (max_sga_size 512)
LOGALLSUPCOLS
UPDATERECORDFORMAT COMPACT
TABLE hr.EMPLOYEES;
TABLE hr.REGION;
```

For this Extract, you can create multiple DISTPATHS to send trail data to different locations. You can also specify the tables that would be replicated for a specific destination, while configuring the Fitering Options for the DISTPATH. The following screens shows the creation of a DISTPATH where the target host is WEST.

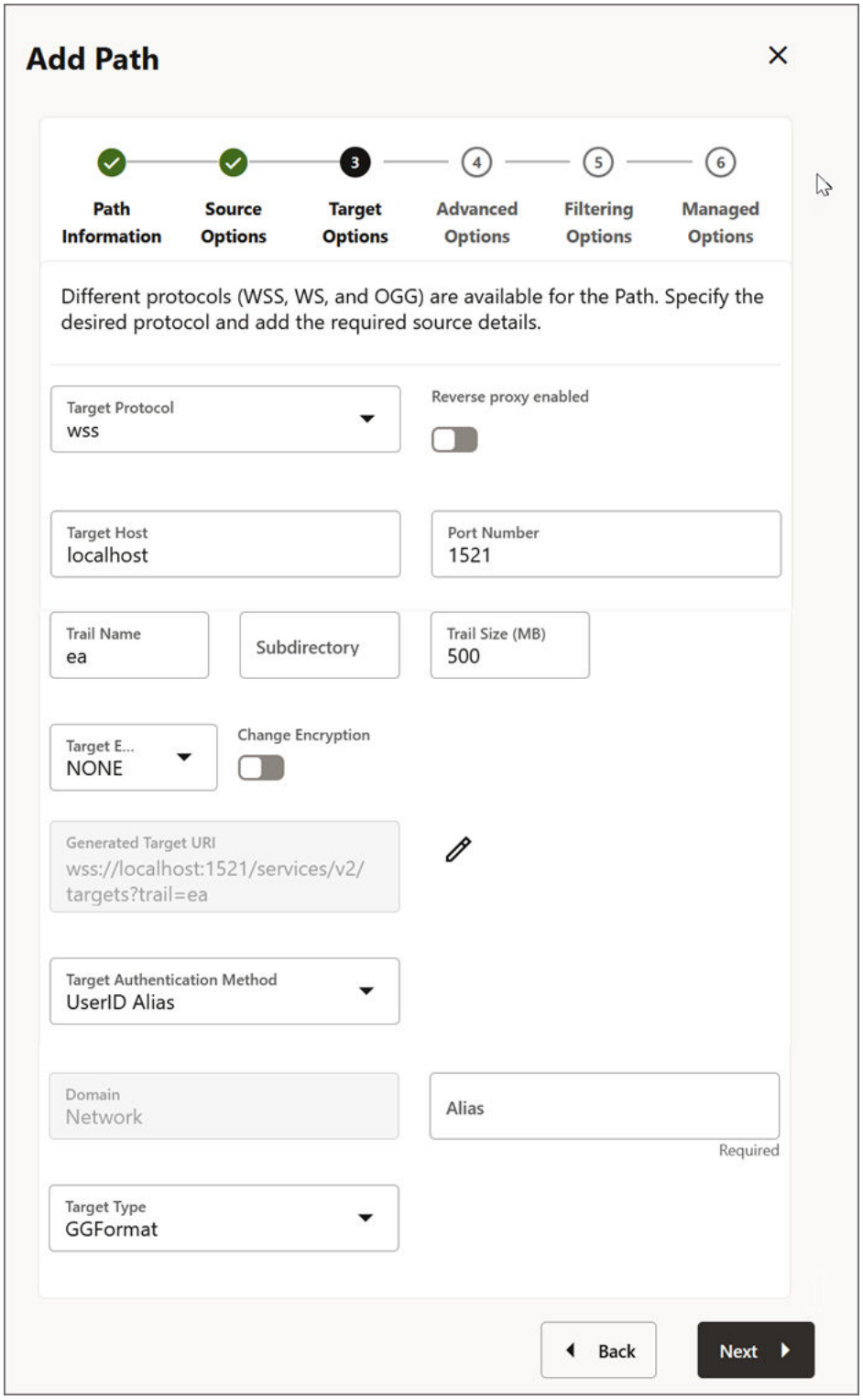
1. The following image displays adding a DISTPATH, dpe for the **depl_east** deployment.



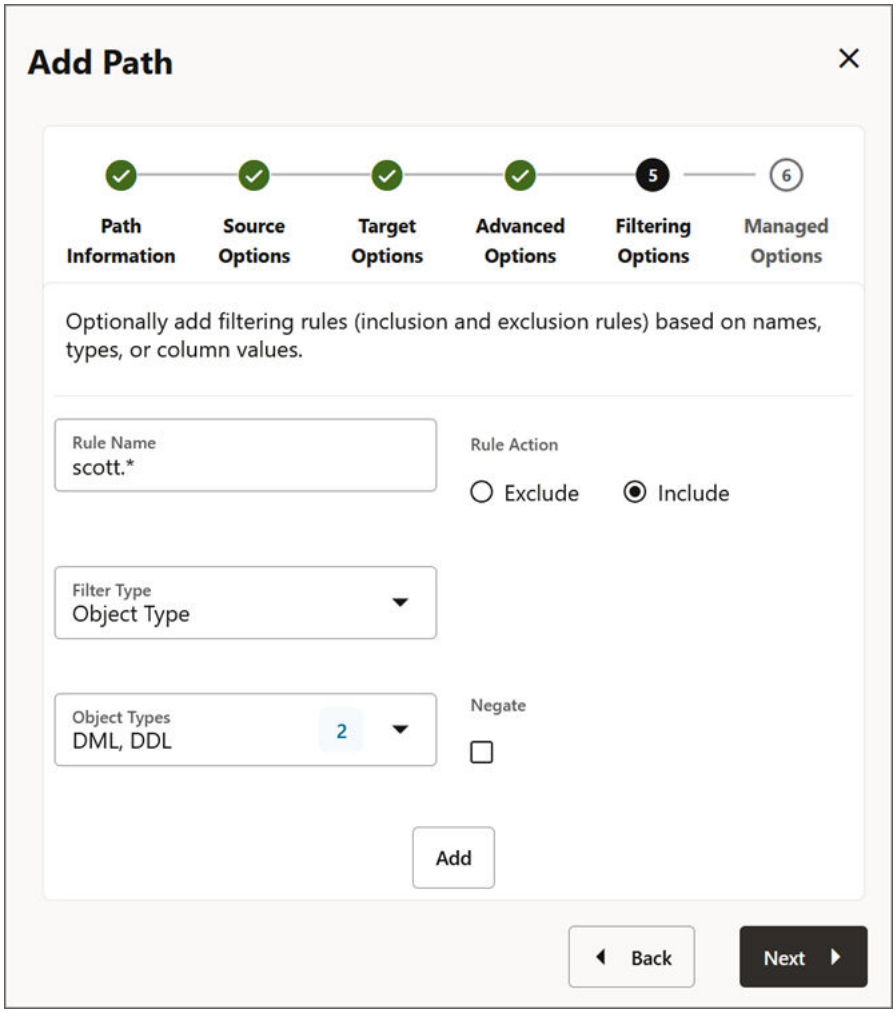
2. The following screens displays the options to set up on the source side for Extract, trail, source URI and other options. In this step, the source Extract trail file is configured.



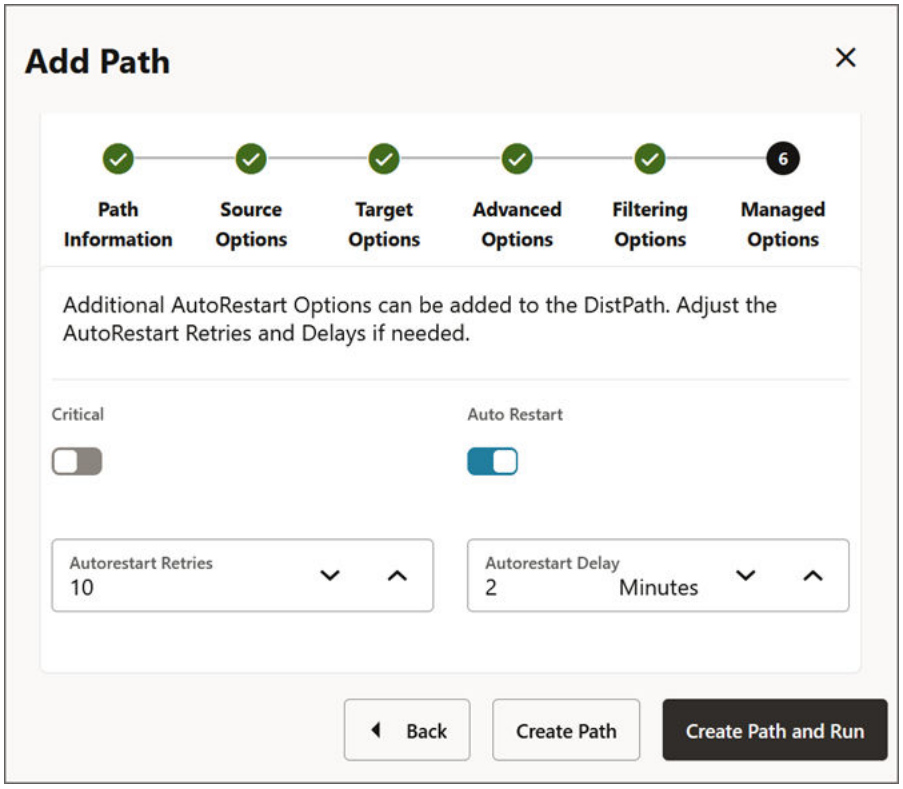
3. The following screen shows the configuration for the target database. At this stage, you can specify the destination where you want the trail file replicated. When you create another DISTPATH, you can provide a different target URI that would allow replication to that destination.



4. The following step allows you to set up the filtering rules for replication. So, you can specify the filtering rules to select tables, columns, values that you need replicated for each target URI.



5. The following screen allows you to set up autostart/autorestart options and create the DISTPATH.

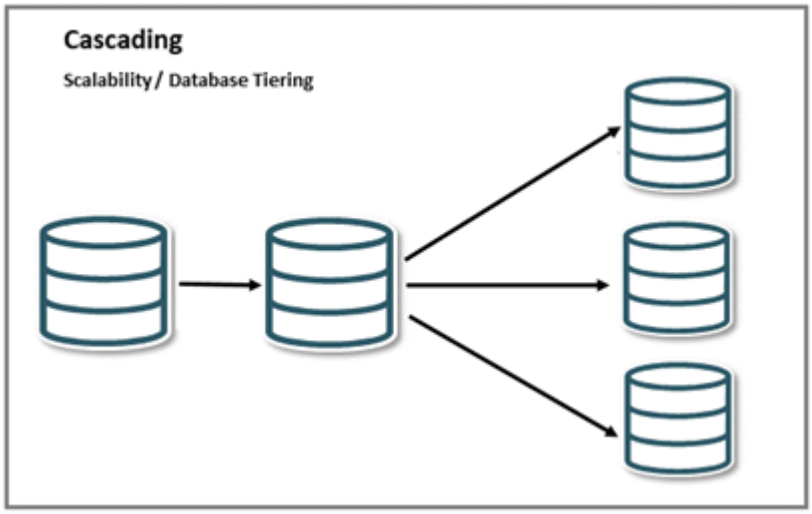


You an create other DISTPATHS in a smilar manner to add multiple destinations for replicating data from the same source trail.

Cascading

Oracle GoldenGate supports cascading synchronization, where Oracle GoldenGate propagates data changes from the source database to a second database, and then on to a third database or multiple target databases.

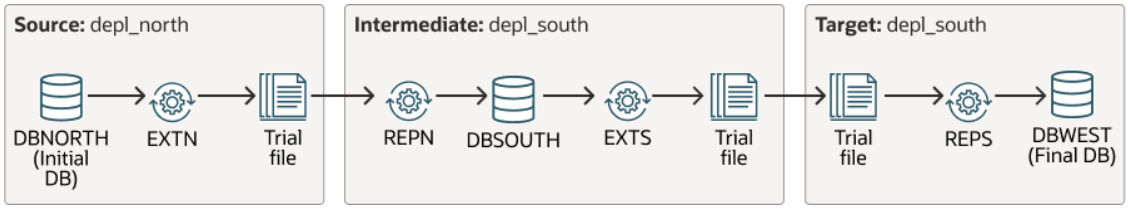
See Cascading Script for sample automation scripts to run a Cascading data replication scenario.



The workflow in this type of configuration is as follows:

1. An Extract on the initial source writes captured data to a local trail, and a DISTPATH sends the data to a remote trail on the transitional system in the cascade.
2. On the second system, Replicat applies the data to the local database.
3. Another Extract on the second system captures the data from the local database and writes it to a local trail.
4. A DISTPATH sends the data to a remote trail on the final system in the cascade, where it is applied to the local database by another Replicat.

This workflow is depicted in the following diagram:



A cascading configuration can be used for any of the following real-world scenarios:

Scalable Data Replication Configuration
To scale the data replication framework on to multiple deployments, when replicating from one source database on to secondary and then eventually a target database.

Data Tiering
To create multiple tiers for data replication set up, you can build a cascaded environment over local and remote hosts.

Extended environments
To configure extended environments where original replication is used for additional databases and applications.

Connecting between disconnected deployments
To allow connectivity between one or more target systems, which do not have a direct connection to the source, but the secondary system can connect in both directions.

Limit the network activities from the source system
To limit the network activities from the source system to secondary and target systems.

Replicating across geographically distant regions
To send data to two or more servers that are geographically far apart. For example, sending data from Chicago to Los Angeles and then from Los Angeles to servers throughout China would be a use case for setting up a cascading topology.

Considerations for Cascading Topologies

This configuration can be used to perform data filtering and conversion if the character sets on all systems are identical. If character sets differ, conversions between character sets cannot be performed, and you must configure Replicat to perform the conversion and transformation on the target.

- In Oracle GoldenGate environments earlier then 23ai, the parameters `IGNOREAPPLOPS` and `GETREPLICATES` were used to setup a cascaded replication environment. On the second system, you needed to configure the Extract group to capture Replicat activity and to ignore local business application activity.
- With Oracle GoldenGate 23ai, the parameters `IGNOREAPPLOPS` and `GETREPLICATES` are desupported and you use tagging to streamline replication changes. In a default configuration, Replicat tags changes with a '00' tag into the transitional database. The Extract process on the transitional database captures all DML changes, by default. However, for DDL operations, DDL tagging needs to be explicitly added if it needs to be replicated to the final target database. This is done by using the `DDLOPTIONS INCLUDETAG 00`parameter setting.

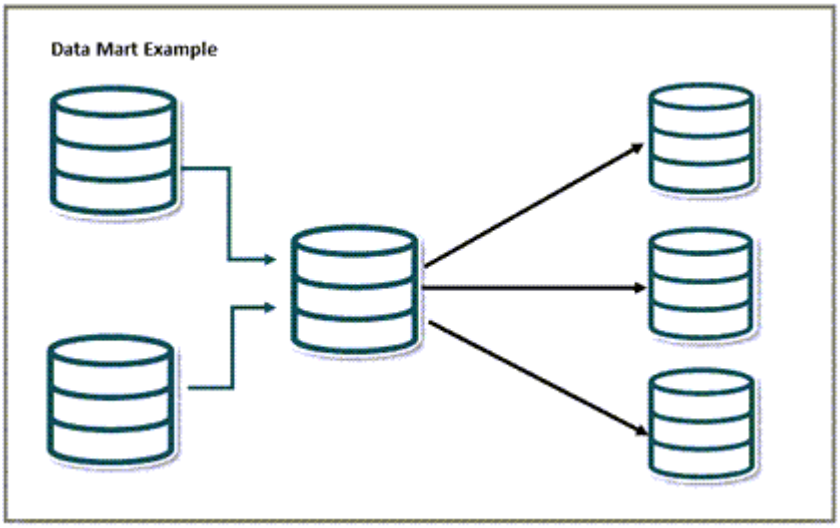
  See the Cascading Script to learn about setting up replication and checking the replication statistics using the Admin Client commands and the REST API client.

Cascading Configuration Real-World Use Cases

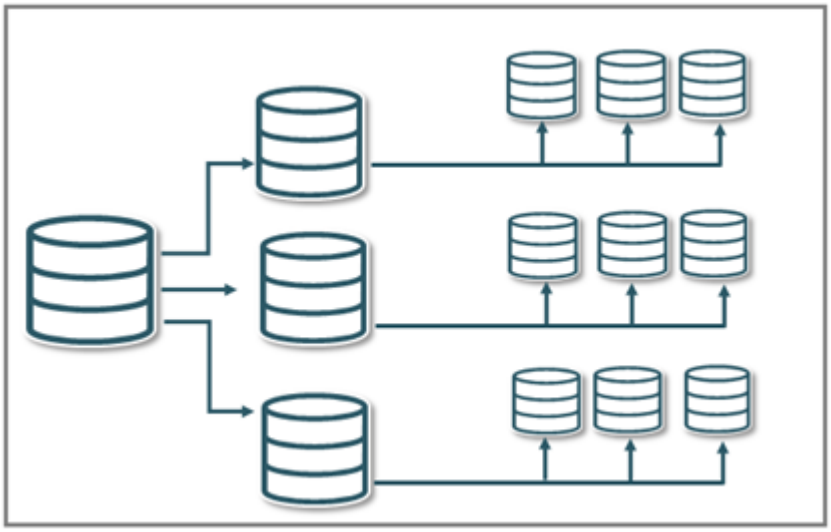
In a transitional database, additional filtering and transformation occurs before changes are replicated to the final dataset. This allows you to replicate changes from a source database to an transitional database, which in turn, is a source database to another end-target database.

You can set up even more complex replication topologies, as shown in the following examples.

The following image shows a **DataMart** configuration where the Data Warehouse is fed by multiple different sources and the data warehouse itself replicates data to different data marts.

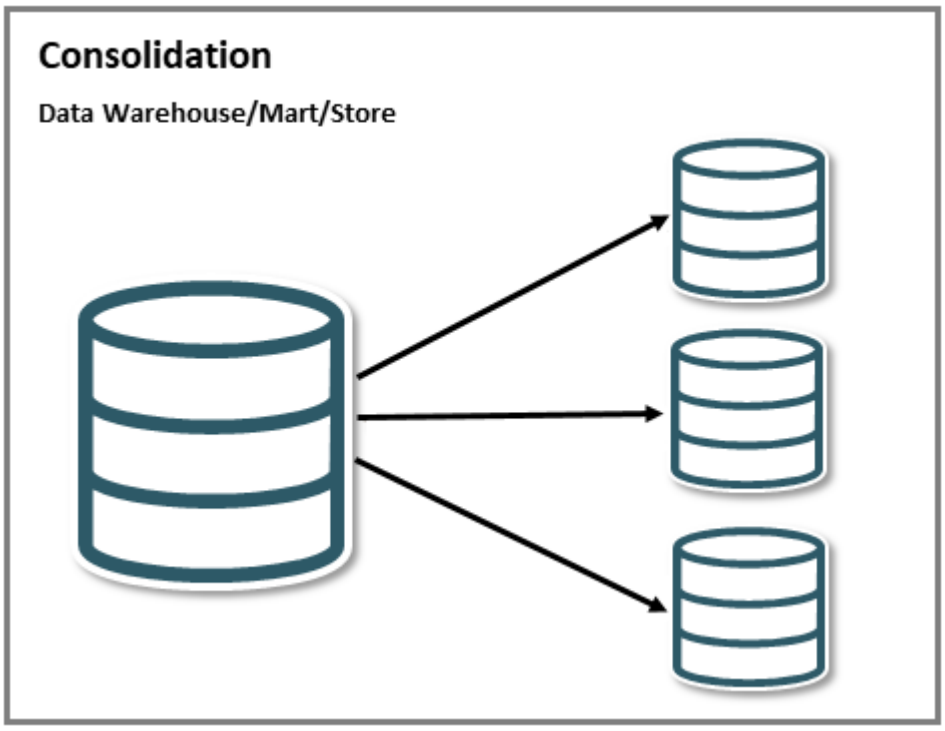


The following image shows central databases that are replicating changes from the Headquarter to the State to the County level in a hierarchical manner.



Consolidation

A data warehousing configuration is a many-to-one configuration. Multiple source databases send data to one target warehouse database. Oracle GoldenGate supports homegeneous and heterogeneous transfer of data, with capabilities for filtering and conversion on any system in the configuration although the support varies by database platform.



If data is being consolidated into a single target database, it is often necessary to track the lineage of that data. Using Oracle GoldenGate Tokens (link), additional metadata can be written to the target records. This would include the source database information on where this record originated, or when it was committed on the source database.

Oracle GoldenGate transformation routines can be used to further enhance the data as it is applied to the target database or data target.

Advanced Topologies

Apart from the standard topologies described in previous sections, including unidirectional, bidirectional, broadcast,cascading, and consolidation, there are many more patterns that can be configured using these topologies due to the architecture of Oracle GoldenGate.

For example, a broadcast topology can include unidirectional targets and bidirectional targets. Active-Active replication can be enhanced by adding an additional unidirectional replication stream from one of the active systems to a reporting database to offload reports. In an active-passive bidirectional topology, an additional bidirectional server could be added for the purpose of a zero downtime upgrade.

It is up to the businesses to decide the combination of topologies to use in a particular scenario or use case.

4

Replicate between Data Fabrics

This section covers commonly used Oracle GoldenGate architectures when replicating between two or more non-relational databases or *data fabrics*.

Solutions for Data Replication in Different Data Mesh or Data Fabric Environments

The entire purpose of creating a Data Fabric or a Data Mesh is to bring more value to enterprise data, making it better, faster, cheaper to achieve business transformation objectives.

Data Lake Ingestion

Data lake ingestion provides continuous, real-time capture and delivery of changed data between OLTP and object storage, data lake, or data lakehouse targets. Oracle GoldenGate delivers data to Oracle or non-Oracle platforms, such as Snowflake, Azure Data Lake, Google BigQuery, and other cloud object stores.

See Realtime Data Ingestion into Snowflake with GoldenGate for DAA in the *Oracle GoldenGate for Distributed Applications and Analytics*.

Real-time Streaming Pipeline and Analytics

Oracle Stream Analytics ingests real-time data from Oracle GoldenGate changed data, and from messaging environments like Kafka and JMS. A graphical pipeline designer can perform data transformations and apply time-series and geo-spatial analytics on these event streams. Oracle Stream Analytics is available standalone, a deployment option in OCI GoldenGate, and is included with Oracle Distributed Applications and Analytics.

See Realtime Message Ingestion to OCI Streaming with GoldenGate for DAA in the *Oracle GoldenGate for Distributed Applications and Analytics* as an example of this implementation.

Data Streams

Most Oracle GoldenGate DDL and DML capabilities can also be accessed through developer APIs. Deployed using the AsyncAPI standard, developers can subscribe and publish to the Oracle GoldenGate data event model.

See Async API in the Oracle GoldenGate Microservices Documentation.

To view the script for configuring a replication environment using Data Streams, see Data Streams Script.

A
Automation Scripts

The objective of sample scripts provided for different scenarios is to provide a preparatory outline to set up a data replication environment for different business use cases. The scripts are can be used with cURL for the REST API framework and using OBEY commands in Admin Client to set up various environments for real-world scenarios.

Reporting

Scripts are available in cURL and as OBEY commands to be run in Admin Client, to test the business reporting scenario. You can use the scripts available in the following topics to:

- Add a data replication environment and view the processes that are created after the scripts runs successfully.
- Check the statistical reports for Daily, Hourly, and Total committed DML and DDL operations.
- Delete the data replication environment and verify that the environment was deleted after testing.

cURL

Setup a Data Replication Environment Using cURL

Copy and use the following cURL script to set up Oracle GoldenGate data replication environment on an pre-installed database.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
# --
# -- Create USERIDALIAS to connection from GoldenGate to the Databases
# --
#
-------------------------------------------------------------------------
---------------------

# Add UserIdAlias GGNORTH to connect to the Database instance DBNORTH
curl -s -k -X POST https://north:9001/services/v2/credentials/
OracleGoldenGate/ggnorth                    \
```

```
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"userid":"ggadmin@dbnorth","password":"xxxxxx"}' | jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/credentials/OracleGoldenGate/
ggnorth                      \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'

# Add UserIdAlias GGSOUTH to connect to the Database instance DBSOUTH
curl -s -k -X POST https://south:9101/services/v2/credentials/
OracleGoldenGate/ggsouth                     \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"userid":"ggadmin@dbsouth","password":"xxxxxx"}' | jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/credentials/OracleGoldenGate/
ggsouth                      \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Add Schematranda
# -- Add Heartbeattable
# -- Add Checkpointtables
# --
#
-------------------------------------------------------------------------------
----------------------

# Add Supplemental Logging to Database Schema HR (Schematrandata) on source
database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
```

```
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"add","schemaName":"hr"}' | jq '.messages'

curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"info", "schemaName":"hr"}' | jq '.response'

# Add Heartbeattable on source database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat   \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"frequency":60}' | jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq .'response'

# Add Checkpointtable on target database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"add","name":"ggadmin.ggs_checkpointtable"}' | jq
'.messages'

curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"info","name":"ggadmin.ggs_checkpointtable"}' | jq
'.messages'

# Add Heartbeattable on target database GGSOUTH
```

```
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat   \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"frequency":60}' | jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'

#
------------------------------------------------------------------------------
----------------------
# --
# -- Add Extracts on source database GGNORTH
# --
#
------------------------------------------------------------------------------
----------------------

curl -s -k -X POST https://north:9001/services/v2/extracts/
EXTN                                                \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"description":"Extract - Region North"
         ,"config":["EXTRACT EXTN"
                   ,"USERIDALIAS ggnorth"
                   ,"EXTTRAIL north/ea"
                   ,"DDL INCLUDE MAPPED"
                   ,"DDLOPTIONS REPORT"
                   ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                   ,"WARNLONGTRANS 15MINUTES, CHECKINTERVAL 5MINUTES"
                   ,"TABLE hr.*;"
                   ]
         ,"source": "tranlogs"
         ,"credentials":{"alias":"ggnorth"}
         ,"registration": {"optimized": false}
         ,"begin":"now"
         ,"targets":[{"name":"ea", "path":"north/"}]
         ,"status":"running"
         }' | jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/extracts/
EXTN                                                \
     -H "Content-Type: application/
json"                                                                  \
```

```
     -H "Accept: application/
json"                                                                          \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'

#
-------------------------------------------------------------------------------
---------------------
# --
# -- Add DistPath from source to target system
# --
#
-------------------------------------------------------------------------------
---------------------

curl -s -k -X POST https://north:9002/services/v2/sources/
DPNS                                                 \
     -H 'Content-Type: application/
json'                                                                    \
     -H "Accept: application/
json"                                                                          \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                        \
     -d '{"description": "Region: From: North, To: South"
          ,"name": "DPNS"
          ,"source":
            {"uri": "trail://north:9002/services/v2/sources?trail=north/ea"
            ,"details": {"encryption": {"algorithm": "NONE"}}
            }
          ,"target":
            {"uri": "wss://south:9103/services/v2/targets?trail=north/da"
            ,"authenticationMethod": {"certificate": "default"}
            ,"details":
               {"trail": {"sizeMB": 100}
               ,"encryption": {"algorithm": "NONE"}
               ,"compression": {"enabled": false}
               }
            }
          ,"options":
            {"eofDelayCSecs": 10
            ,"checkpointFrequency": 10
            ,"critical": false
            ,"autoRestart": {"retries": 10, "delay": 2}
            ,"streaming": true
            }
          ,"begin": "now"
          ,"encryptionProfile": "LocalWallet"
          ,"status": "running"
          }'                                                 | jq '.messages'

curl -s -k -X GET https://north:9002/services/v2/sources/
DPNS                                                 \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                          \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'
```

```
#
------------------------------------------------------------------------------
---------------------
# --
# -- Add Replicat at target Database GGSOUTH
# --
#
------------------------------------------------------------------------------
---------------------

curl -s -k -X POST https://south:9101/services/v2/replicats/
REPN                                              \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"description":"Replicat - Region South"
         ,"config":["REPLICAT repn"
                       ,"USERIDALIAS ggsouth DOMAIN OracleGoldenGate"
                       ,"DDL INCLUDE MAPPED"
                       ,"DDLOPTIONS REPORT"
                       ,"DDLERROR DEFAULT, DISCARD"
                       ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                       ,"REPERROR (DEFAULT, DISCARD)"
                       ,"MAP hr.*, TARGET hr.*;"
                  ]
         ,"credentials": {"alias": "ggsouth"}
         ,"mode": {"parallel":true,"type": "nonintegrated"}
         ,"source": {"name": "da", "path": "north"}
         ,"checkpoint":{"table": "ggadmin.ggs_checkpointtable"}
         ,"status": "running"
         }' | jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/replicats/
REPN                                               \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'

#
------------------------------------------------------------------------------
---------------------
```

Check the Statistical Reports Using cURL

Copy and use the following cURL script to check the statistical data for the DDL and DML operations.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
# --
# -- Create USERIDALIAS to connection from GoldenGate to the Databases
# --
#
-------------------------------------------------------------------------------
----------------------

echo " "
echo
"-------------------------------------------------------------------------------
-------------"
echo "--"
echo "-- Extract EXN "
echo "--"
echo
"-------------------------------------------------------------------------------
-------------"
echo " "

echo "Extract EXTN status:"
curl -s -k -X GET https://north:9001/services/v2/extracts/
EXTN                                                \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Extract EXTN lag:"
curl -s -k -X POST https://north:9001/services/v2/extracts/EXTN/
command                                     \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                   \
      | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Extract EXTN statistics:"
curl -s -k -X POST https://north:9001/services/v2/extracts/EXTN/
command                                     \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
```

```
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                    \
      | jq '.response.reply' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT


echo " "
echo
"-------------------------------------------------------------------------
-------------"
echo "--"
echo "-- DistPath DPNS"
echo "--"
echo
"-------------------------------------------------------------------------
-------------"
echo " "


echo "DistPath DPNS status:"
curl -s -k -X GET https://north:9002/services/v2/sources/
DPNS                                              \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

curl -s -k -X GET https://north:9002/services/v2/sources/DPNS/
stats                                          \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
      | jq '.response' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT


echo " "
echo
"-------------------------------------------------------------------------
-------------"
echo "--"
echo "-- Replicat REPN "
echo "--"
echo
"-------------------------------------------------------------------------
-------------"
echo " "

echo "Replicat REPN status:"
```

```
curl -s -k -X GET https://south:9101/services/v2/replicats/
REPN                                                  \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Replicat REPN lag:"
curl -s -k -X POST https://south:9101/services/v2/replicats/REPN/
command                                    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                    \
      |  sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Replicat REPN statistics:"
curl -s -k -X POST https://south:9101/services/v2/replicats/REPN/
command                                    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                  \
      | jq '.response.reply' | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v
OKNODOT

exit

#
--------------------------------------------------------------------------------
----------------------
```

Delete the Replication Environment

Copy and use the following cURL script to delete the data replication environment after you have tested it and do not need it.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
# --
# -- stop & Delete Replicat
# --
#
------------------------------------------------------------------------------
----------------------

curl -s -k -X PATCH https://south:9101/services/v2/replicats/
REPN                                                \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"status":"stopped"}'                                           |
jq '.messages'


curl -s -k -X DELETE  https://south:9101/services/v2/replicats/
REPN                                               \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    |  jq
'.messages'

#
------------------------------------------------------------------------------
----------------------
# --
# -- Stop & Delete DistPath
# --
#
------------------------------------------------------------------------------
----------------------


curl -s -k -X PATCH https://north:9002/services/v2/sources/
DPNS                                                 \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
```

```
     -d '{"status":"stopped"}'                                          |  jq
'.messages'

curl -s -k -X DELETE https://north:9002/services/v2/sources/
DPNS                                          \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    | jq
'.messages'

#
------------------------------------------------------------------------------
---------------------
# --
# -- Stop & Delete Extracts
# --
#
------------------------------------------------------------------------------
---------------------

curl -s -k -X PATCH https://north:9001/services/v2/extracts/
EXTN                                          \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"status":"stopped"}'                                          |
jq '.messages'

curl -s -k -X DELETE https://north:9001/services/v2/extracts/
EXTN                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    | jq
'.messages'

#
------------------------------------------------------------------------------
---------------------
# --
# -- Delete Schematranda
# -- Delete Checkpointtable
# -- Delete Heartbeattables
# --
#
------------------------------------------------------------------------------
---------------------

# Delete SchemaTrandata at Database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
```

```
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"delete","schemaName":"hr"}'                  | jq
'.messages'

# Delete Checkpointtable at Database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
    -H "Content-Type: application/
json"                                                                     \
    -H "Accept: application/
json"
\
    -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
    -d '{"operation":"delete","name":"ggadmin.ggs_checkpointtable"}' |  jq
'.messages' ###

# Delete Heartbeattable at Database GGNORTH
curl -s -k -X DELETE https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='              | jq
'.messages'

# Delete Heartbeattable at Database GGSOUTH
curl -s -k -X DELETE https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='              | jq
'.messages'

#
-------------------------------------------------------------------------------
----------------------
# --
# --Delete USERIDALIAS from GoldenGate
# --
#
-------------------------------------------------------------------------------
----------------------

curl -s -k -X DELETE https://north:9001/services/v2/credentials/
OracleGoldenGate/ggnorth                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='              | jq
```

```
'.messages'

curl -s -k -X DELETE https://south:9101/services/v2/credentials/
OracleGoldenGate/ggsouth                  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='              | jq
'.messages'

#
--------------------------------------------------------------------------
-------------------
# --
# -- Delete Trail Files
# --
#
--------------------------------------------------------------------------
----------------------

curl -s -k -X POST https://north:9001/services/v2/commands/
execute                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"name": "purge"
             ,"purgeType": "trails"
                 ,"trails": [{"name": "ea","path": "north/"}]
                 ,"useCheckpoints": false
                 ,"keep": [{"type": "min","units": "files","value": 0}]
         }'                                                                |
jq '.messages'

curl -s -k -X POST https://north:9001/services/v2/commands/
execute                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"name": "purge"
             ,"purgeType": "trails"
                 ,"trails": [{"name": "da","path": "north/"}]
                 ,"useCheckpoints": false
                 ,"keep": [{"type": "min","units": "files","value": 0}]
         }'                                                                |
jq '.messages'
```

OBEY

Scripts are available in cURL and as OBEY commands to be run in Admin Client, to test the business reporting scenario. You can use the scripts available in the following topics to:

- Add a data replication environment and view the processes that are created after the scripts runs successfully.
- Check the statistical reports for Daily, Hourly, and Total committed DML and DDL operations.
- Delete the data replication environment and verify that the environment was deleted after testing.

Set Up a Data Replication Environment Using OBEY Files

Copy and use the following OBEY script to set up Oracle GoldenGate data replication environment on an pre-installed database.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
--
-- Connect the GoldenGate Deployment depl_north
--
CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD xxxxxx !

ALTER CREDENTIALSTORE ADD USER ggadmin@dbnorth ALIAS ggnorth DOMAIN
OracleGoldenGate PASSWORD ggadmin
INFO CREDENTIALSTORE
DBLOGIN USERIDALIAS ggnorth DOMAIN OracleGoldenGate
ADD SCHEMATRANDATA hr
ADD HEARTBEATTABLE

ADD EXTRACT extn INTEGRATED TRANLOG BEGIN NOW
REGISTER EXTRACT extn database
ADD EXTTRAIL north/ea, EXTRACT extn
START EXTRACT extn

ADD DISTPATH dpns SOURCE trail://north:9002/services/v2/sources?
trail=north/ea TARGET wss://south:9103/services/v2/targets?trail=north/da !
START DISTPATH dpns

--
-- Connect the GoldenGate Deployment depl_south
--

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD xxxxxx !
```

```
ALTER CREDENTIALSTORE ADD USER ggadmin@dbsouth ALIAS ggsouth DOMAIN
OracleGoldenGate PASSWORD ggadmin
INFO CREDENTIALSTORE
DBLOGIN USERIDALIAS ggsouth DOMAIN OracleGoldenGate
ADD CHECKPOINTTABLE ggadmin.ggs_checkpointtable
ADD HEARTBEATTABLE

ADD REPLICAT repn, PARALLEL, EXTTRAIL north/da, CHECKPOINTTABLE
ggadmin.ggs_checkpointtable

START REPLICAT repn
INFO ALL
INFO DISTPATH ALL

DISCONNECT
```

After creating the OBEY file, create a shell script to run in Admin Client:

```
cp EXTN.prm  /u01/app/oracle/deployments/depl_north/etc/conf/ogg/
cp REPN.prm  /u01/app/oracle/deployments/depl_south/etc/conf/ogg/

echo "obey add_replication_reporting.oby" | adminclient
```

Check the Statistical Reports Using OBEY Files

Copy and use the following OBEY script by adjusting the values for each of the options with the options in your enviornment, to check the statistical data for the DDL and DML operations.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
--
-- Connect the GoldenGate Deployment depl_north
--
CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !

INFO  EXTRACT extn
SEND  EXTRACT extn, GETLAG
STATS EXTRACT extn, TOTAL, TOTALSONLY *.*


INFO DISTPATH  DPNS
STATS DISTPATH DPNS
--
-- Connect the GoldenGate Deployment depl_south
--
```

```
CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !

INFO  REPLICAT repn
SEND  REPLICAT repn, GETLAG
STATS REPLICAT repn, TOTAL, TOTALSONLY *.*

DISCONNECT
```

After you create the preceding .oby file, create a shell script to run in Admin Client that would run the .oby commands:

```
echo "obey check_replication_reporting.oby" | adminclient
```

Delete the Replication Environment Using OBEY Files

Copy and use the following OBEY script by adjusting the values for each of the options with the options in your enviornment, to delete the data replication environment.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
--
-- Connect the GoldenGate Deployment depl_south
--

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !

DBLOGIN USERIDALIAS ggsouth DOMAIN OracleGoldenGate
KILL REPLICAT repn
DELETE REPLICAT repn

DELETE CHECKPOINTTABLE ggadmin.ggs_checkpointtable !
DELETE HEARTBEATTABLE !

ALTER CREDENTIALSTORE DELETE USER ggadmin@dbsouth ALIAS ggsouth DOMAIN
OracleGoldenGate
INFO CREDENTIALSTORE

PURGE EXTTRAIL north/da

-- Connect the GoldenGate Deployment depl_north
--

CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
STOP DISTPATH dpns
DELETE DISTPATH dpns

DBLOGIN USERIDALIAS ggnorth DOMAIN OracleGoldenGate
```

```
KILL EXTRACT extn
DELETE  EXTRACT extn

INFO ALL
INFO DISTPATH ALL

ALTER CREDENTIALSTORE DELETE USER ggadmin@dbnorth ALIAS ggnorth DOMAIN
OracleGoldenGate
INFO CREDENTIALSTORE

PURGE EXTTRAIL north/ea
DISCONNECT
```

After you create the preceding .oby file, create a shell script to run in Admin Client that would run the .oby commands:

```
rm -f /u01/app/oracle/deployments/depl_north/etc/conf/ogg/EXTN.prm
rm -f /u01/app/oracle/deployments/depl_south/etc/conf/ogg/REPN.prm

echo "obey delete_replication_reporting.oby" | adminclient
```

Bidirectional Replication Using Active-Active Configuration

Scripts are available in cURL and as OBEY commands to be run in Admin Client, to test the business reporting scenario. You can use the scripts available in the following topics to:

cURL

Create Bidirectional Configuration Using cURL

Copy and use the following cURL script to set up Oracle GoldenGate data replication environment on an pre-installed database and Oracle GoldenGate deployment.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
#!/bin/bash

# Clean up environment
/home/oracle/scripts/misc/cleanup.sh > /dev/null

#
------------------------------------------------------------------------------
----------------------
# --
# -- Create USERIDALIAS to connection from GoldenGate to the Databases
```

```
# --
#
-------------------------------------------------------------------------------
----------------------

# Add UserIdAlias GGNORTH to connect to the Database instance DBNORTH
curl -s -k -X POST https://north:9001/services/v2/credentials/
OracleGoldenGate/ggnorth                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"userid":"ggadmin@dbnorth","password":"ggadmin"}'             |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/credentials/OracleGoldenGate/
ggnorth                     \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                     |
jq '.response'

# Add UserIdAlias GGSOUTH to connect to the Database instance DBSOUTH
curl -s -k -X POST https://south:9101/services/v2/credentials/
OracleGoldenGate/ggsouth                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"userid":"ggadmin@dbsouth","password":"ggadmin"}'             |
jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/credentials/OracleGoldenGate/
ggsouth                     \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                     |
jq '.response'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Add Schematranda
# -- Add Heartbeattable
# -- Add Checkpointtables
# --
#
```

```
--------------------------------------------------------------------------------
----------------------

# Add Supplemental Logging to Database Schema HR (Schematrandata) on database
GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"operation":"add","schemaName":"hr"}'                          |
jq '.messages'

curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"operation":"info", "schemaName":"hr"}'                        |
jq '.response'

# Add Supplemental Logging to Database Schema HR (Schematrandata) on database
GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"operation":"add","schemaName":"hr"}'                          |
jq '.messages'

curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"operation":"info", "schemaName":"hr"}'                        |
jq '.response'

# Add Heartbeattable on source database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat   \
     -H "Content-Type: application/
json"                                                                    \
```

```
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"frequency":60}'                                              |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat    \
     -H "Content-Type: application/
json"                                                                 \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                     |
jq '.response'

# Add Heartbeattable on target database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat   \
     -H "Content-Type: application/
json"                                                                 \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"frequency":60}'                                              |
jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat    \
     -H "Content-Type: application/
json"                                                                 \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                     |
jq '.response'

# Add Checkpointtable on database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                 \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"add","name":"ggadmin.ggs_checkpointtable"}'      |
jq '.messages'

curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                 \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
```

```
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"info","name":"ggadmin.ggs_checkpointtable"}'       |
jq '.messages'

# Add Checkpointtable on database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"add","name":"ggadmin.ggs_checkpointtable"}'        |
jq '.messages'

curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"info","name":"ggadmin.ggs_checkpointtable"}'       |
jq '.messages'

#
------------------------------------------------------------------------------
----------------------
# --
# -- Add Extracts on Databases
# --
#
------------------------------------------------------------------------------
----------------------

# Add Extract EXTN on Database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/extracts/
EXTN                                              \
     -H 'Content-Type: application/
json'                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"description":"Extract - Region North"
         ,"config":["EXTRACT EXTN"
                   ,"USERIDALIAS ggnorth"
                   ,"EXTTRAIL north/ea"
                   ,"TRANLOGOPTIONS EXCLUDETAG +"
                   ,"DDL INCLUDE MAPPED"
                   ,"DDLOPTIONS REPORT"
                   ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                   ,"WARNLONGTRANS 15 MINUTES, CHECKINTERVAL 5 MINUTES"
                   ,"TABLE hr.*;"
```

```
                    ]
          ,"source": "tranlogs"
          ,"credentials":{"alias":"ggnorth"}
          ,"registration": {"optimized": false}
          ,"begin":"now"
          ,"targets":[{"name":"ea", "path":"north/"}]
              ,"status":"running"
          }'                                                                  |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/extracts/
EXTN                                                 \
     -H "Content-Type: application/
json"                                                                        \
     -H "Accept: application/
json"                                                                          \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'

# Add Extract EXTS on Database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/extracts/
EXTS                                                 \
     -H 'Content-Type: application/
json'                                                                        \
     -H "Accept: application/
json"                                                                          \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                          \
     -d '{"description":"Extract - Region South"
         ,"config":["EXTRACT EXTS"
                   ,"USERIDALIAS ggsouth"
                   ,"EXTTRAIL south/ea"
                   ,"TRANLOGOPTIONS EXCLUDETAG +"
                   ,"DDL INCLUDE MAPPED"
                   ,"DDLOPTIONS REPORT"
                   ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                   ,"WARNLONGTRANS 15 MINUTES, CHECKINTERVAL 5 MINUTES"
                   ,"TABLE hr.*;"
                   ]
              ,"source": "tranlogs"
              ,"credentials":{"alias":"ggsouth"}
              ,"registration": {"optimized": false}
              ,"begin":"now"
              ,"targets":[{"name":"ea", "path":"south/"}]
              ,"status":"running"
              }' | jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/extracts/
EXTS                                                 \
     -H "Content-Type: application/
json"                                                                        \
     -H "Accept: application/
json"                                                                          \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                          |
jq '.response'

#
```

```
--------------------------------------------------------------------------------
---------------------
# --
# -- Add DistPaths to Systems to route Trailfiles in each direction
# --
#
--------------------------------------------------------------------------------
---------------------

# Add DistPath DPNS from North to South
curl -s -k -X POST https://north:9002/services/v2/sources/
DPNS                                                \
     -H 'Content-Type: application/
json'                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                      \
     -d '{"description": "Region: From: North, To: South"
          ,"name": "DPNS"
          ,"source":
            {"uri": "trail://north:9002/services/v2/sources?trail=north/ea"
            ,"details": {"encryption": {"algorithm": "NONE"}}
            }
          ,"target":
            {"uri": "wss://south:9103/services/v2/targets?trail=north/da"
            ,"authenticationMethod": {"certificate": "default"}
            ,"details":
               {"trail": {"sizeMB": 100}
               ,"encryption": {"algorithm": "NONE"}
               ,"compression": {"enabled": false}
               }
            }
          ,"options":
            {"eofDelayCSecs": 10
            ,"checkpointFrequency": 10
            ,"critical": false
            ,"autoRestart": {"retries": 10, "delay": 2}
            ,"streaming": true
            }
          ,"begin": "now"
          ,"encryptionProfile": "LocalWallet"
          ,"status": "running"
          }'                                                             |
jq '.messages'

curl -s -k -X GET https://north:9002/services/v2/sources/
DPNS                                                \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                        |
jq '.response'

# Add DistPath DPSN from South to North
```

```
curl -s -k -X POST https://south:9102/services/v2/sources/
DPSN                                                  \
     -H 'Content-Type: application/
json'                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"description": "Region: From: South, To: North"
          ,"name": "DPSN"
          ,"source":
            {"uri": "trail://south:9102/services/v2/sources?trail=south/ea"
            ,"details": {"encryption": {"algorithm": "NONE"}}
            }
          ,"target":
            {"uri": "wss://north:9003/services/v2/targets?trail=south/da"
            ,"authenticationMethod": {"certificate": "default"}
            ,"details":
               {"trail": {"sizeMB": 100}
               ,"encryption": {"algorithm": "NONE"}
               ,"compression": {"enabled": false}
               }
            }
          ,"options":
            {"eofDelayCSecs": 10
            ,"checkpointFrequency": 10
            ,"critical": false
            ,"autoRestart": {"retries": 10, "delay": 2}
            ,"streaming": true
            }
          ,"begin": "now"
          ,"encryptionProfile": "LocalWallet"
          ,"status": "running"
          }'                                                                |
jq '.messages'

curl -s -k -X GET https://south:9102/services/v2/sources/
DPSN                                                  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'
#
------------------------------------------------------------------------------
----------------------
# --
# -- Add Replicats to Databases
# --
#
------------------------------------------------------------------------------
----------------------

# Add Replicat REPS on Database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/replicats/
REPS                                                \
```

```
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"description":"Replicat - Region North"
             ,"config":["REPLICAT reps"
                        ,"USERIDALIAS ggnorth DOMAIN OracleGoldenGate"
                        ,"DDL INCLUDE MAPPED"
                        ,"DDLOPTIONS REPORT"
                        ,"DDLERROR DEFAULT, DISCARD"
                        ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                        ,"REPERROR (DEFAULT, DISCARD)"
                        ,"MAP hr.*, TARGET hr.*;"
                    ]
             ,"credentials": {"alias": "ggnorth"}
         ,"mode": {"parallel":true,"type": "integrated"}
         ,"source": {"name": "da", "path": "south"}
         ,"checkpoint":{"table": "ggadmin.ggs_checkpointtable"}
         ,"status": "running"
         }'                                                                |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/replicats/
REPS                                                \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='   | jq '.response'

# Add Replicat REPN on Database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/replicats/
REPN                                               \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"description":"Replicat - Region South"
         ,"config":["REPLICAT repn"
                        ,"USERIDALIAS ggsouth DOMAIN OracleGoldenGate"
                        ,"DDL INCLUDE MAPPED"
                        ,"DDLOPTIONS REPORT"
                        ,"DDLERROR DEFAULT, DISCARD"
                        ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                        ,"REPERROR (DEFAULT, DISCARD)"
                        ,"MAP hr.*, TARGET hr.*;"
                    ]
         ,"credentials": {"alias": "ggsouth"}
         ,"mode": {"parallel":true,"type": "integrated"}
         ,"source": {"name": "da", "path": "north"}
         ,"checkpoint":{"table": "ggadmin.ggs_checkpointtable"}
         ,"status": "running"
```

```
        }'                                                                    |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/replicats/
REPN                                                \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.response'

#
--------------------------------------------------------------------------------
----------------------
```

Check the Statistics in a Bidirectional Environment Using cURL

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
#!/bin/bash

#
--------------------------------------------------------------------------------
----------------------
# --
# -- Create USERIDALIAS to connection from GoldenGate to the Databases
# --
#
--------------------------------------------------------------------------------
----------------------

echo " "
echo
"--------------------------------------------------------------------------------
-------------"
echo "--"
echo "-- GoldenGate Instance NORTH: Status of Extract (EXTN), DistPath
(DPNS), and Replicat (REPS) "
echo "--"
echo
"--------------------------------------------------------------------------------
-------------"
echo " "

echo "Extract EXTN status:"
curl -s -k -X GET https://north:9001/services/v2/extracts/
EXTN                                                \
```

```
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Extract EXTN lag:"
curl -s -k -X POST https://north:9001/services/v2/extracts/EXTN/
command                                    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                  \
      | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Extract EXTN statistics:"
curl -s -k -X POST https://north:9001/services/v2/extracts/EXTN/
command                                    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                    \
      | jq '.response.reply' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT

echo "Replicat REPS status:"
curl -s -k -X GET https://north:9001/services/v2/replicats/
REPS                                           \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "DistPath DPNS status:"
curl -s -k -X GET https://north:9002/services/v2/sources/
DPNS                                           \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

curl -s -k -X GET https://north:9002/services/v2/sources/DPNS/
stats                                          \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
```

```
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
      | jq '.response' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT

echo "Replicat REPS lag:"
curl -s -k -X POST https://north:9001/services/v2/replicats/REPS/
command                                  \
     -H "Content-Type: application/
json"                                                              \
     -H "Accept: application/
json"                                                               \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                               \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                \
      |  sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Replicat REPS statistics:"
curl -s -k -X POST https://north:9001/services/v2/replicats/REPS/
command                                  \
     -H "Content-Type: application/
json"                                                              \
     -H "Accept: application/
json"                                                               \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                               \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                               \
      | jq '.response.reply' | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v
OKNODOT

echo " "
echo
"------------------------------------------------------------------------
-------------"
echo "--"
echo "-- GoldenGate Instance NORTH: Status of Extract (EXTN), DistPath
(DPNS), and Replicat (REPS) "
echo "--"
echo
"------------------------------------------------------------------------
-------------"
echo " "

echo "Extract EXTS status:"
curl -s -k -X GET https://south:9101/services/v2/extracts/
EXTS                                          \
     -H "Content-Type: application/
json"                                                              \
     -H "Accept: application/
json"                                                               \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Extract EXTS lag:"
```

```
curl -s -k -X POST https://south:9101/services/v2/extracts/EXTS/
command                                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                  \
      | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Extract EXTS statistics:"
curl -s -k -X POST https://south:9101/services/v2/extracts/EXTS/
command                                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                    \
      | jq '.response.reply' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT

echo "DistPath DPSN status:"
curl -s -k -X GET https://south:9102/services/v2/sources/
DPSN                                           \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

curl -s -k -X GET https://south:9102/services/v2/sources/DPSN/
stats                                      \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
      | jq '.response' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT

echo "Replicat REPN status:"
curl -s -k -X GET https://south:9101/services/v2/replicats/
REPN                                           \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Replicat REPN lag:"
```

```
curl -s -k -X POST https://south:9101/services/v2/replicats/REPN/
command                                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                  \
      |  sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Replicat REPN statistics:"
curl -s -k -X POST https://south:9101/services/v2/replicats/REPN/
command                                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                   \
      | jq '.response.reply' | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v
OKNODOT

exit

#
-------------------------------------------------------------------------------
----------------------
```

Remove the Bidirectional Replication Setup Using cURL

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
#!/bin/bash

#
-------------------------------------------------------------------------------
----------------------
# --
# -- stop & Delete Replicat
# --
#
-------------------------------------------------------------------------------
----------------------
```

```
curl -s -k -X PATCH https://north:9001/services/v2/replicats/
REPS                                                  \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                 \
     -d '{"status":"stopped"}'                                       |
jq '.messages'


curl -s -k -X DELETE  https://north:9001/services/v2/replicats/
REPS                                               \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                  |
jq '.messages'

curl -s -k -X PATCH https://south:9101/services/v2/replicats/
REPN                                                  \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                 \
     -d '{"status":"stopped"}'                                       |
jq '.messages'


curl -s -k -X DELETE  https://south:9101/services/v2/replicats/
REPN                                               \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                  |
jq '.messages'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Stop & Delete DistPath
# -- Purge Target Trail File
# --
#
-------------------------------------------------------------------------------
----------------------


curl -s -k -X PATCH https://north:9002/services/v2/sources/
```

```
DPNS                                                \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                 \
     -d '{"status":"stopped"}'                                       |
jq '.messages'

curl -s -k -X DELETE https://north:9002/services/v2/sources/
DPNS                                               \
     -H 'Content-Type: application/
json'                                                                \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                  |
jq '.messages'

curl -s -k -X PATCH https://south:9102/services/v2/sources/
DPSN                                               \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                 \
     -d '{"status":"stopped"}'                                       |
jq '.messages'

curl -s -k -X DELETE https://south:9102/services/v2/sources/
DPSN                                               \
     -H 'Content-Type: application/
json'                                                                \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                  |
jq '.messages'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Stop & Delete Extracts
# --
#
-------------------------------------------------------------------------------
----------------------

curl -s -k -X PATCH https://north:9001/services/v2/extracts/
EXTN                                               \
     -H 'Content-Type: application/
json'                                                                \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                 \
     -d '{"status":"stopped"}'                                       |
jq '.messages'


curl -s -k -X DELETE https://north:9001/services/v2/extracts/
```

```
EXTN                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    |
jq '.messages'

curl -s -k -X POST https://north:9001/services/v2/commands/
execute                                        \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"name": "purge"
         ,"purgeType": "trails"
         ,"trails": [{"name": "ea","path": "north/"}]
         ,"useCheckpoints": false
         ,"keep": [{"type": "min","units": "files","value": 0}]
         }'                                                            |
jq '.messages'

curl -s -k -X PATCH https://south:9101/services/v2/extracts/
EXTS                                          \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"status":"stopped"}'                                         |
jq '.messages'


curl -s -k -X DELETE https://south:9101/services/v2/extracts/
EXTS                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    |
jq '.messages'

curl -s -k -X POST https://south:9101/services/v2/commands/
execute                                        \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"name": "purge"
             ,"purgeType": "trails"
                 ,"trails": [{"name": "ea","path": "south/"}]
                 ,"useCheckpoints": false
                 ,"keep": [{"type": "min","units": "files","value": 0}]
```

```
        }'                                                                    |
jq '.messages'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Delete Schematranda
# -- Delete Checkpointtable
# -- Delete Heartbeattables
# --
#
-------------------------------------------------------------------------------
----------------------

# Delete SchemaTrandata at Databases
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"operation":"delete","schemaName":"hr"}'                     |
jq '.messages'

curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"operation":"delete","schemaName":"hr"}'                     |
jq '.messages'

# Delete Checkpointtables at Databases
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"operation":"delete","name":"ggadmin.ggs_checkpointtable"}'  |
jq '.messages'

curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
```

```
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"delete","name":"ggadmin.ggs_checkpointtable"}'     |
jq '.messages'

# Delete Heartbeattable at Database GGNORTH
curl -s -k -X DELETE https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

# Delete Heartbeattable at Database GGSOUTH
curl -s -k -X DELETE https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Delete USERIDALIAS from GoldenGate
# --
#
-------------------------------------------------------------------------------
----------------------

curl -s -k -X DELETE https://north:9001/services/v2/credentials/
OracleGoldenGate/ggnorth                  \
     -H "Content-Type: application/
```

```
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

curl -s -k -X DELETE https://south:9101/services/v2/credentials/
OracleGoldenGate/ggsouth                  \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/credentials/
OracleGoldenGate                              \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

#
------------------------------------------------------------------------------
----------------------
# --
# -- Delete Trail Files
# --
#
------------------------------------------------------------------------------
----------------------

curl -s -k -X POST https://north:9001/services/v2/commands/
execute                                          \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"name": "purge"
             ,"purgeType": "trails"
                 ,"trails": [{"name": "da","path": "north/"}]
                 ,"useCheckpoints": false
                 ,"keep": [{"type": "min","units": "files","value": 0}]
         }'                                                              |
jq '.messages'


curl -s -k -X POST https://north:9001/services/v2/commands/
execute                                          \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
```

```
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"name": "purge"
             ,"purgeType": "trails"
                 ,"trails": [{"name": "da","path": "south/"}]
                 ,"useCheckpoints": false
                 ,"keep": [{"type": "min","units": "files","value": 0}]
         }'                                                                  |
jq '.messages'

# Clean up environment
/home/oracle/scripts/misc/cleanup.sh > /dev/null
```

OBEY

Scripts are available in cURL and as OBEY commands to be run in Admin Client, to test the business reporting scenario. You can use the scripts available in the following topics to:

- Add a data replication environment and view the processes that are created after the scripts runs successfully.
- Check the statistical reports for Daily, Hourly, and Total committed DML and DDL operations.
- Delete the data replication environment and verify that the environment was deleted after testing.

Bidirectional Configuration Using OBEY Files

Copy and use the following OBEY script to set up Oracle GoldenGate data replication environment on an pre-installed database.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
ALTER CREDENTIALSTORE ADD USER ggadmin@dbnorth ALIAS ggnorth DOMAIN
OracleGoldenGate PASSWORD ggadmin
INFO  CREDENTIALSTORE

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !
ALTER CREDENTIALSTORE ADD USER ggadmin@dbsouth ALIAS ggsouth DOMAIN
OracleGoldenGate PASSWORD ggadmin
INFO  CREDENTIALSTORE

CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggnorth DOMAIN OracleGoldenGate
```

```
ADD SCHEMATRANDATA hr
ADD CHECKPOINTTABLE ggadmin.ggs_checkpointtable
ADD HEARTBEATTABLE

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggsouth DOMAIN OracleGoldenGate
ADD SCHEMATRANDATA hr
ADD CHECKPOINTTABLE ggadmin.ggs_checkpointtable
ADD HEARTBEATTABLE

CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggnorth DOMAIN OracleGoldenGate

ADD EXTRACT extn INTEGRATED TRANLOG BEGIN NOW
REGISTER EXTRACT extn database
ADD EXTTRAIL north/ea, EXTRACT extn
START EXTRACT extn

ADD DISTPATH dpns SOURCE trail://north:9002/services/v2/sources?
trail=north/ea TARGET wss://south:9103/services/v2/targets?trail=north/da !
START DISTPATH dpns

ADD REPLICAT reps, PARALLEL, EXTTRAIL south/da, CHECKPOINTTABLE
ggadmin.ggs_checkpointtable
START REPLICAT reps

INFO ALL
INFO DISTPATH ALL

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggsouth DOMAIN OracleGoldenGate

ADD EXTRACT exts INTEGRATED TRANLOG BEGIN NOW
REGISTER EXTRACT exts database
ADD EXTTRAIL south/ea, EXTRACT exts
START EXTS

ADD DISTPATH dpsn SOURCE trail://south:9102/services/v2/sources?
trail=south/ea TARGET wss://north:9103/services/v2/targets?trail=south/da !
START DISTPATH dpsn

ADD   REPLICAT repn, PARALLEL, EXTTRAIL north/da, CHECKPOINTTABLE
ggadmin.ggs_checkpointtable
START REPLICAT repn

INFO ALL
INFO DISTPATH ALL

DISCONNECT
```

After creating the OBEY file, create a shell script to run in Admin Client. This script runs triggers the bidirectional replication setup using the `.oby` file:

```
#!/bin/bash

# Clean up environment
/home/oracle/scripts/misc/cleanup.sh > /dev/null

# Copy parameter file (usually edited with EDIT PARAMs)
cp EXTN.prm  /u01/app/oracle/deployments/depl_north/etc/conf/ogg/
cp REPS.prm  /u01/app/oracle/deployments/depl_north/etc/conf/ogg/

cp EXTS.prm  /u01/app/oracle/deployments/depl_north/etc/conf/ogg/
cp REPN.prm  /u01/app/oracle/deployments/depl_south/etc/conf/ogg/

# Run the GoldenGate Obey script
echo "obey add_replication_ActiveActive.oby" | adminclient | tee
add_replication_ActiveActive.log
```

Check the Processes in the Bidirectional Environment Using OBEY Files

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
--
-- Connect the GoldenGate Deployment depl_north
--
CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !

INFO  EXTRACT extn
SEND  EXTRACT extn, GETLAG
STATS EXTRACT extn, TOTAL, TOTALSONLY *.*

INFO DISTPATH  DPNS
STATS DISTPATH DPNS

INFO  REPLICAT reps
SEND  REPLICAT reps, GETLAG
STATS REPLICAT reps, TOTAL, TOTALSONLY *.*

--
-- Connect the GoldenGate Deployment depl_south
--

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !

INFO  EXTRACT exts
SEND  EXTRACT exts, GETLAG
```

```
STATS EXTRACT exts, TOTAL, TOTALSONLY *.*

INFO  DISTPATH DPSN
STATS DISTPATH DPSN

INFO  REPLICAT repn
SEND  REPLICAT repn, GETLAG
STATS REPLICAT repn, TOTAL, TOTALSONLY *.*

DISCONNECT
```

After creating the OBEY file, create a shell script to run in Admin Client:

```
echo "obey check_replication_ActiveActive.oby" | adminclient
```

Remove the Bidirectional Replication Environment Using OBEY Files

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggnorth DOMAIN OracleGoldenGate

KILL   EXTRACT  extn
DELETE EXTRACT  extn
PURGE  EXTTRAIL north/ea

STOP   DISTPATH dpns
DELETE DISTPATH dpns
PURGE  EXTTRAIL south/da

KILL   REPLICAT reps
DELETE REPLICAT reps

INFO ALL
INFO DISTPATH ALL

DELETE SCHEMATRANDATA hr
DELETE CHECKPOINTTABLE ggadmin.ggs_checkpointtable !
DELETE HEARTBEATTABLE !

ALTER CREDENTIALSTORE DELETE USER ggadmin@dbnorth ALIAS ggnorth DOMAIN
OracleGoldenGate
INFO CREDENTIALSTORE

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggsouth DOMAIN OracleGoldenGate
```

```
KILL   EXTRACT  exts
DELETE EXTRACT  exts
PURGE  EXTTRAIL south/ea

STOP   DISTPATH dpsn
DELETE DISTPATH dpsn
PURGE  EXTTRAIL north/da

KILL   REPLICAT repn
DELETE REPLICAT repn

INFO ALL
INFO DISTPATH ALL

DELETE SCHEMATRANDATA hr
DELETE CHECKPOINTTABLE ggadmin.ggs_checkpointtable !
DELETE HEARTBEATTABLE !

ALTER CREDENTIALSTORE DELETE USER ggadmin@dbsouth ALIAS ggsouth DOMAIN
OracleGoldenGate
INFO CREDENTIALSTORE

DISCONNECT
```

After creating the OBEY file, create a shell script to run in Admin Client:

```
#!/bin/bash

# Run the GoldenGate Obey script
echo "obey delete_replication_ActiveActive.oby" | adminclient | tee
delete_replication_ActiveActive.log

# Clean up environment
/home/oracle/scripts/misc/cleanup.sh > /dev/null
```

Cascading Script

cURL

Cascading Configuration Using cURL

Copy and use the following cURL script to set up Oracle GoldenGate data replication environment on an pre-installed database.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
#!/bin/bash

# Clean up environment
/home/oracle/scripts/misc/cleanup.sh > /dev/null

#
------------------------------------------------------------------------------
----------------------
# --
# -- Create USERIDALIAS to connection from GoldenGate to the Databases
# --
#
------------------------------------------------------------------------------
----------------------

# Add UserIdAlias GGNORTH to connect to the Database instance DBNORTH
curl -s -k -X POST https://north:9001/services/v2/credentials/
OracleGoldenGate/ggnorth                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"userid":"ggadmin@dbnorth","password":"ggadmin"}'               |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/credentials/OracleGoldenGate/
ggnorth                     \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                       |
jq '.response'

# Add UserIdAlias GGSOUTH to connect to the Database instance DBSOUTH
curl -s -k -X POST https://south:9101/services/v2/credentials/
OracleGoldenGate/ggsouth                    \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"userid":"ggadmin@dbsouth","password":"ggadmin"}'               |
jq '.messages'
```

```
curl -s -k -X GET https://south:9101/services/v2/credentials/OracleGoldenGate/
ggsouth                        \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                       |
jq '.response'

# Add UserIdAlias GGWEST to connect to the Database instance DBSOUTH
curl -s -k -X POST https://west:9201/services/v2/credentials/OracleGoldenGate/
ggwest                         \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"userid":"ggadmin@dbwest","password":"ggadmin"}'               |
jq '.messages'

curl -s -k -X GET https://west:9201/services/v2/credentials/OracleGoldenGate/
ggwest                         \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                       |
jq '.response'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Add Schematranda
# -- Add Heartbeattable
# -- Add Checkpointtables
# --
#
-------------------------------------------------------------------------------
----------------------

# Add Supplemental Logging to Database Schema HR (Schematrandata) on source
database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"operation":"add","schemaName":"hr"}'                          |
jq '.messages'

curl -s -k -X POST https://north:9001/services/v2/connections/
```

```
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                 \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                \
     -d '{"operation":"info", "schemaName":"hr"}'                    |
jq '.response'

# Add Supplemental Logging to Database Schema HR (Schematrandata) on
intermediate database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                 \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                \
     -d '{"operation":"add","schemaName":"hr"}'                      |
jq '.messages'

curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                 \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                \
     -d '{"operation":"info", "schemaName":"hr"}'                    |
jq '.response'

# Add Heartbeattable on source database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat   \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                 \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                \
     -d '{"frequency":60}'                                           |
jq '.messages'

curl -s -k -X GET https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                 \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                  |
jq .'response'

# Add Heartbeattable on target database GGSOUTH
```

```
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat   \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                 \
     -d '{"frequency":60}'                                           |
jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                  |
jq '.response'

# Add Heartbeattable on target database GGWEST
curl -s -k -X POST https://west:9201/services/v2/connections/
OracleGoldenGate.ggwest/tables/heartbeat     \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                 \
     -d '{"frequency":60}'                                           |
jq '.messages'

curl -s -k -X GET https://west:9201/services/v2/connections/
OracleGoldenGate.ggwest/tables/heartbeat      \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                  |
jq '.response'

# Add Checkpointtable on intermediate database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                 \
     -d '{"operation":"add","name":"ggadmin.ggs_checkpointtable"}'   |
jq '.messages'

curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
     -H "Content-Type: application/
```

```
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"info","name":"ggadmin.ggs_checkpointtable"}'      |
jq '.messages'

# Add Checkpointtable on target database GGWEST
curl -s -k -X POST https://west:9201/services/v2/connections/
OracleGoldenGate.ggwest/tables/checkpoint    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"add","name":"ggadmin.ggs_checkpointtable"}'       |
jq '.messages'

curl -s -k -X POST https://west:9201/services/v2/connections/
OracleGoldenGate.ggwest/tables/checkpoint    \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                     \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"operation":"info","name":"ggadmin.ggs_checkpointtable"}'      |
jq '.messages'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Add Extracts on source database GGNORTH
# --
#
-------------------------------------------------------------------------------
----------------------

curl -s -k -X POST https://north:9001/services/v2/extracts/
EXTN                                                \
     -H 'Content-Type: application/
json'                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"description":"Extract - Region North"
         ,"config":["EXTRACT extn"
                   ,"USERIDALIAS ggnorth"
                   ,"EXTTRAIL north/ea"
                   ,"DDL INCLUDE MAPPED"
                   ,"DDLOPTIONS REPORT"
                   ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                   ,"WARNLONGTRANS 15MINUTES, CHECKINTERVAL 5MINUTES"
                   ,"TABLE hr.*;"
```

```
                    ]
          ,"source": "tranlogs"
          ,"credentials":{"alias":"ggnorth"}
          ,"registration": {"optimized": false}
          ,"begin":"now"
          ,"targets":[{"name":"ea", "path":"north/"}]
          ,"status":"running"
          }'                                                              | jq
'.messages'

curl -s -k -X GET https://north:9001/services/v2/extracts/
EXTN                                                 \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                        \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                        |
jq '.response'

#
------------------------------------------------------------------------------
----------------------
# --
# -- Add DistPath from source to intermediate system
# --
#
------------------------------------------------------------------------------
----------------------

curl -s -k -X POST https://north:9002/services/v2/sources/
DPNS                                                 \
     -H 'Content-Type: application/
json'                                                                    \
     -H "Accept: application/
json"                                                                        \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"description": "Region: From: North, To: South"
          ,"name": "DPNS"
          ,"source":
            {"uri": "trail://north:9002/services/v2/sources?trail=north/ea"
            ,"details": {"encryption": {"algorithm": "NONE"}}
            }
          ,"target":
            {"uri": "wss://south:9103/services/v2/targets?trail=north/da"
            ,"authenticationMethod": {"certificate": "default"}
            ,"details":
               {"trail": {"sizeMB": 100}
               ,"encryption": {"algorithm": "NONE"}
               ,"compression": {"enabled": false}
               }
            }
          ,"options":
            {"eofDelayCSecs": 10
            ,"checkpointFrequency": 10
            ,"critical": false
```

```
            ,"autoRestart": {"retries": 10, "delay": 2}
            ,"streaming": true
            }
          ,"begin": "now"
          ,"encryptionProfile": "LocalWallet"
          ,"status": "running"
          }'                                                                    |
jq '.messages'

curl -s -k -X GET https://north:9002/services/v2/sources/
DPNS                                                \
     -H "Content-Type: application/
json"                                                                       \
     -H "Accept: application/
json"                                                                         \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                         |
jq '.response'

#
------------------------------------------------------------------------------
----------------------
# --
# -- Add Replicat at target Database GGSOUTH
# --
#
------------------------------------------------------------------------------
----------------------

curl -s -k -X POST https://south:9101/services/v2/replicats/
REPN                                              \
     -H "Content-Type: application/
json"                                                                       \
     -H "Accept: application/
json"                                                                         \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                        \
     -d '{"description":"Replicat - Region South"
         ,"config":["REPLICAT repn"
                       ,"USERIDALIAS ggsouth DOMAIN OracleGoldenGate"
                       ,"DDL INCLUDE MAPPED"
                       ,"DDLOPTIONS REPORT"
                       ,"DDLERROR DEFAULT, DISCARD"
                       ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                       ,"REPERROR (DEFAULT, DISCARD)"
                       ,"MAP hr.*, TARGET hr.*;"
                   ]
         ,"credentials": {"alias": "ggsouth"}
         ,"mode": {"parallel":true,"type": "nonintegrated"}
         ,"source": {"name": "da", "path": "north"}
         ,"checkpoint":{"table": "ggadmin.ggs_checkpointtable"}
         ,"status": "running"
         }'                                                                   |
jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/replicats/
REPN                                              \
```

```
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.response'

#
------------------------------------------------------------------------------
----------------------
# --
# -- Add 2nd Extract EXTS on source database GGSOUTH
# --
#
------------------------------------------------------------------------------
----------------------

curl -s -k -X POST https://south:9101/services/v2/extracts/
EXTS                                          \
     -H 'Content-Type: application/
json'                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                      \
     -d '{"description":"Extract - Region South"
         ,"config":["EXTRACT exts"
                   ,"USERIDALIAS ggsouth"
                   ,"EXTTRAIL south/ea"
                   ,"DDL INCLUDE MAPPED"
                   ,"DDLOPTIONS INCLUDETAG 00"
                   ,"DDLOPTIONS REPORT"
                   ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                   ,"WARNLONGTRANS 15MINUTES, CHECKINTERVAL 5MINUTES"
                   ,"TABLE hr.*;"
                   ]
             ,"source": "tranlogs"
             ,"credentials":{"alias":"ggsouth"}
             ,"registration": {"optimized": false}
             ,"begin":"now"
             ,"targets":[{"name":"ea", "path":"south/"}]
         ,"status":"running"
             }'                                                          |
jq '.messages'

curl -s -k -X GET https://south:9101/services/v2/extracts/
EXTS                                            \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.response'

#
------------------------------------------------------------------------------
----------------------
# --
```

```
# -- Add 2nd DistPath DPSW from target to target system
# --
#
------------------------------------------------------------------------------
---------------------

curl -s -k -X POST https://south:9102/services/v2/sources/
DPSW                                                  \
     -H 'Content-Type: application/
json'                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"description": "Region: From: South, To: West"
          ,"name": "DPSW"
          ,"source":
            {"uri": "trail://south:9102/services/v2/sources?trail=south/ea"
            ,"details": {"encryption": {"algorithm": "NONE"}}
            }
          ,"target":
            {"uri": "wss://west:9203/services/v2/targets?trail=south/da"
            ,"authenticationMethod": {"certificate": "default"}
            ,"details":
               {"trail": {"sizeMB": 100}
               ,"encryption": {"algorithm": "NONE"}
               ,"compression": {"enabled": false}
               }
            }
          ,"options":
            {"eofDelayCSecs": 10
            ,"checkpointFrequency": 10
            ,"critical": false
            ,"autoRestart": {"retries": 10, "delay": 2}
            ,"streaming": true
            }
          ,"begin": "now"
          ,"encryptionProfile": "LocalWallet"
          ,"status": "running"
          }'                                                           |
jq '.messages'

curl -s -k -X GET https://south:9102/services/v2/sources/
DPSW                                                  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    |
jq '.response'

#
------------------------------------------------------------------------------
---------------------
# --
# -- Add Replicat REPS at target Database GGWEST
```

```
# --
#
------------------------------------------------------------------------------
---------------------

curl -s -k -X POST https://west:9201/services/v2/replicats/
REPS                                                \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
     -d '{"description":"Replicat - Region West"
         ,"config":["REPLICAT reps"
                       ,"USERIDALIAS ggwest DOMAIN OracleGoldenGate"
                       ,"DDL INCLUDE MAPPED"
                       ,"DDLOPTIONS REPORT"
                       ,"DDLERROR DEFAULT, DISCARD"
                       ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                       ,"REPERROR (DEFAULT, DISCARD)"
                       ,"MAP hr.*, TARGET hr.*;"
                   ]
         ,"credentials": {"alias": "ggwest"}
         ,"mode": {"parallel":true,"type": "nonintegrated"}
         ,"source": {"name": "da", "path": "south"}
         ,"checkpoint":{"table": "ggadmin.ggs_checkpointtable"}
         ,"status": "running"
         }'                                                              |
jq '.messages'

curl -s -k -X GET https://west:9201/services/v2/replicats/
REPS                                                \
     -H "Content-Type: application/
json"                                                                    \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                        |
jq '.response'

#
------------------------------------------------------------------------------
---------------------
```

Check the Transaction Statistics for a Cascading Configuration Using cURL

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
#!/bin/bash

#
------------------------------------------------------------------------------
---------------------
# --
# -- Create USERIDALIAS to connection from GoldenGate to the Databases
# --
#
------------------------------------------------------------------------------
---------------------

echo " "
echo
"------------------------------------------------------------------------------
-------------"
echo "--"
echo "-- Extract EXN "
echo "--"
echo
"------------------------------------------------------------------------------
-------------"
echo " "

echo "Extract EXTN status:"
curl -s -k -X GET https://north:9001/services/v2/extracts/
EXTN                                                  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Extract EXTN lag:"
curl -s -k -X POST https://north:9001/services/v2/extracts/EXTN/
command                                      \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                      \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                      \
     -d '{"command": "GETLAG", "isReported": true}' | jq
```

```
'.response.reply'                                    \
      | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Extract EXTN statistics:"
curl -s -k -X POST https://north:9001/services/v2/extracts/EXTN/
command                                        \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                    \
      | jq '.response.reply' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT


echo " "
echo
"--------------------------------------------------------------------------
-------------"
echo "--"
echo "-- DistPath DPNS"
echo "--"
echo
"--------------------------------------------------------------------------
-------------"
echo " "


echo "DistPath DPNS status:"
curl -s -k -X GET https://north:9002/services/v2/sources/
DPNS                                                \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

curl -s -k -X GET https://north:9002/services/v2/sources/DPNS/
stats                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
      | jq '.response' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT


echo " "
echo
"--------------------------------------------------------------------------
-------------"
```

```
echo "--"
echo "-- Replicat REPN "
echo "--"
echo
"------------------------------------------------------------------------------
-------------"
echo " "

echo "Replicat REPN status:"
curl -s -k -X GET https://south:9101/services/v2/replicats/
REPN                                                \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Replicat REPN lag:"
curl -s -k -X POST https://south:9101/services/v2/replicats/REPN/
command                                      \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                      \
      |  sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Replicat REPN statistics:"
curl -s -k -X POST https://south:9101/services/v2/replicats/REPN/
command                                      \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                    \
      | jq '.response.reply' | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v
OKNODOT

echo " "
echo
"------------------------------------------------------------------------------
-------------"
echo "--"
echo "-- Extract EXTS "
echo "--"
echo
"------------------------------------------------------------------------------
-------------"
echo " "
```

```
echo "Extract EXTS status:"
curl -s -k -X GET https://south:9101/services/v2/extracts/
EXTS                                                  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Extract EXTS lag:"
curl -s -k -X POST https://south:9101/services/v2/extracts/EXTS/
command                                     \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                    \
      | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Extract EXTS statistics:"
curl -s -k -X POST https://south:9101/services/v2/extracts/EXTS/
command                                     \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                    \
      | jq '.response.reply' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT

echo " "
echo
"-------------------------------------------------------------------------
-------------"
echo "--"
echo "-- DistPath DPSW"
echo "--"
echo
"-------------------------------------------------------------------------
-------------"
echo " "


echo "DistPath DPSW status:"
curl -s -k -X GET https://south:9102/services/v2/sources/
DPSW                                                  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
```

```
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

curl -s -k -X GET https://south:9102/services/v2/sources/DPSW/
stats                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
      | jq '.response' | json_reformat | sed 's/\\n/\n/g' |  sed 's/\
\t/\t/g'| grep -v OKNODOT

echo " "
echo
"------------------------------------------------------------------------
-------------"
echo "--"
echo "-- Replicat REPS "
echo "--"
echo
"------------------------------------------------------------------------
-------------"
echo " "

echo "Replicat REPS status:"
curl -s -k -X GET https://west:9201/services/v2/replicats/
REPS                                             \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='  | jq '.response.status'

echo "Replicat REPS lag:"
curl -s -k -X POST https://west:9201/services/v2/replicats/REPS/
command                                        \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
     -d '{"command": "GETLAG", "isReported": true}' | jq
'.response.reply'                                 \
      |  sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v OKNODOT

echo "Replicat REPS statistics:"
curl -s -k -X POST https://west:9201/services/v2/replicats/REPS/
command                                        \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                    \
```

```
     -d '{"command":"STATS",
"arguments":"TOTAL"}'                                                          \
      | jq '.response.reply' | sed 's/\\n/\n/g' |  sed 's/\\t/\t/g'| grep -v
OKNODOT

exit

#
------------------------------------------------------------------------------
---------------------
```

Delete the Cascading Environment Set Up Using cURL

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
#!/bin/bash

#
------------------------------------------------------------------------------
---------------------
# --
# -- Stop & Delete Replicat
# --
#
------------------------------------------------------------------------------
---------------------

curl -s -k -X PATCH https://west:9201/services/v2/replicats/
REPS                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"status":"stopped"}'                                         |
jq '.messages'

curl -s -k -X DELETE  https://west:9201/services/v2/replicats/
REPS                                         \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    |
jq '.messages'

curl -s -k -X PATCH https://south:9101/services/v2/replicats/
```

```
REPN                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"status":"stopped"}'                                         |
jq '.messages'

curl -s -k -X DELETE  https://south:9101/services/v2/replicats/
REPN                                         \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    |
jq '.messages'

#
-------------------------------------------------------------------------------
----------------------
# --
# -- Stop & Delete DistPath
# --
#
-------------------------------------------------------------------------------
----------------------


curl -s -k -X PATCH https://south:9102/services/v2/sources/
DPSW                                           \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"status":"stopped"}'                                       |  jq
'.messages'

curl -s -k -X DELETE https://south:9102/services/v2/sources/
DPSW                                          \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                    |
jq '.messages'

curl -s -k -X PATCH https://north:9002/services/v2/sources/
DPNS                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
```

```
        -d '{"status":"stopped"}'                                          |
jq '.messages'

curl -s -k -X DELETE https://north:9002/services/v2/sources/
DPNS                                          \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                        |
jq '.messages'

#
-------------------------------------------------------------------------------
---------------------
# --
# -- Stop & Delete Extracts
# --
#
-------------------------------------------------------------------------------
---------------------

curl -s -k -X PATCH https://south:9101/services/v2/extracts/
EXTS                                          \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"status":"stopped"}'                                         |
jq '.messages'


curl -s -k -X DELETE https://south:9101/services/v2/extracts/
EXTS                                         \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                        |
jq '.messages'

curl -s -k -X PATCH https://north:9001/services/v2/extracts/
EXTN                                          \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"status":"stopped"}'                                         |
jq '.messages'

curl -s -k -X DELETE https://north:9001/services/v2/extracts/
EXTN                                          \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                        |
jq '.messages'
```

```
#
------------------------------------------------------------------------------
---------------------
# --
# -- Delete Schematranda
# -- Delete Checkpointtable
# -- Delete Heartbeattables
# --
#
------------------------------------------------------------------------------
---------------------

# Delete SchemaTrandata at Database GGNORTH
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                \
     -d '{"operation":"delete","schemaName":"hr"}'                       |
jq '.messages'


# Delete SchemaTrandata at Database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/trandata/schema    \
     -H "Content-Type: application/
json"                                                                \
     -H "Accept: application/
json"                                                                  \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                \
     -d '{"operation":"delete","schemaName":"hr"}'                       |
jq '.messages'


# Delete Checkpointtable at Database GGSOUTH
curl -s -k -X POST https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/checkpoint  \
    -H "Content-Type: application/
json"                                                                 \
    -H "Accept: application/
json"
\
    -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                  \
    -d '{"operation":"delete","name":"ggadmin.ggs_checkpointtable"}'       |
jq '.messages'

# Delete Checkpointtable at Database GGWEST
curl -s -k -X POST https://south:9201/services/v2/connections/
OracleGoldenGate.ggwest/tables/checkpoint   \
    -H "Content-Type: application/
```

```
json"                                                                    \
    -H "Accept: application/
json"
\
    -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                     \
    -d '{"operation":"delete","name":"ggadmin.ggs_checkpointtable"}'       |
jq '.messages'


# Delete Heartbeattable at Database GGNORTH
curl -s -k -X DELETE https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/tables/heartbeat \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

# Delete Heartbeattable at Database GGSOUTH
curl -s -k -X DELETE https://south:9101/services/v2/connections/
OracleGoldenGate.ggsouth/tables/heartbeat \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

# Delete Heartbeattable at Database GGWEST
curl -s -k -X DELETE https://west:9201/services/v2/connections/
OracleGoldenGate.ggwest/tables/heartbeat   \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                      |
jq '.messages'

#
-------------------------------------------------------------------------------
----------------------
# --
# --Delete USERIDALIAS from GoldenGate
# --
#
-------------------------------------------------------------------------------
----------------------

curl -s -k -X DELETE https://north:9001/services/v2/credentials/
OracleGoldenGate/ggnorth                  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
```

```
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                          |
jq '.messages'
curl -s -k -X DELETE https://south:9101/services/v2/credentials/
OracleGoldenGate/ggsouth                  \
     -H "Content-Type: application/
json"                                                                     \
     -H "Accept: application/
json"                                                                       \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                          |
jq '.messages'

curl -s -k -X DELETE https://west:9201/services/v2/credentials/
OracleGoldenGate/ggwest                   \
     -H "Content-Type: application/
json"                                                                     \
     -H "Accept: application/
json"                                                                       \
     -H 'Authorization: Basic Z2dtYTpHR21hXzIzYWk='                          |
jq '.messages'

#
--------------------------------------------------------------------------------
--------------------
# --
# -- Delete Trail Files
# --
#
--------------------------------------------------------------------------------
----------------------

curl -s -k -X POST https://north:9001/services/v2/commands/
execute                                          \
     -H "Content-Type: application/
json"                                                                     \
     -H "Accept: application/
json"                                                                       \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                      \
     -d '{"name": "purge"
             ,"purgeType": "trails"
                 ,"trails": [{"name": "ea","path": "north/"}]
                 ,"useCheckpoints": false
                 ,"keep": [{"type": "min","units": "files","value": 0}]
         }'                                                                |
jq '.messages'


curl -s -k -X POST https://south:9101/services/v2/commands/
execute                                          \
     -H "Content-Type: application/
json"                                                                     \
     -H "Accept: application/
json"                                                                       \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                      \
     -d '{"name": "purge"
```

```
            ,"purgeType": "trails"
                ,"trails": [{"name": "da","path": "north/"}]
                ,"useCheckpoints": false
                ,"keep": [{"type": "min","units": "files","value": 0}]
        }'                                                                  |
jq '.messages'


curl -s -k -X POST https://south:9101/services/v2/commands/
execute                                             \
     -H "Content-Type: application/
json"                                                                   \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"name": "purge"
            ,"purgeType": "trails"
                ,"trails": [{"name": "ea","path": "south/"}]
                ,"useCheckpoints": false
                ,"keep": [{"type": "min","units": "files","value": 0}]
        }'                                                                  |
jq '.messages'

curl -s -k -X POST https://west:9201/services/v2/commands/
execute                                             \
     -H "Content-Type: application/
json"                                                                   \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
Z2dtYTpHR21hXzIzYWk='                                                   \
     -d '{"name": "purge"
            ,"purgeType": "trails"
                ,"trails": [{"name": "da","path": "south/"}]
                ,"useCheckpoints": false
                ,"keep": [{"type": "min","units": "files","value": 0}]
        }'                                                                  |
jq '.messages'

# Clean up environment
/home/oracle/scripts/misc/cleanup.sh > /dev/null
```

OBEY

Scripts are available in cURL and as OBEY commands to be run in Admin Client, to test the business reporting scenario. You can use the scripts available in the following topics to:

- Add a data replication environment and view the processes that are created after the scripts runs successfully.
- Check the statistical reports for Daily, Hourly, and Total committed DML and DDL operations.
- Delete the data replication environment and verify that the environment was deleted after testing.

Add a Cascading Environment for Data Replication Using OBEY Files

Copy and use the following OBEY script to set up a cascaded Oracle GoldenGate data replication environment on an pre-installed database.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
--
-- Add Credentials
--

CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
ALTER CREDENTIALSTORE ADD USER ggadmin@dbnorth ALIAS ggnorth DOMAIN
OracleGoldenGate PASSWORD ggadmin

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !
ALTER CREDENTIALSTORE ADD USER ggadmin@dbsouth ALIAS ggsouth DOMAIN
OracleGoldenGate PASSWORD ggadmin

CONNECT https://west:9201 DEPLOYMENT depl_west AS ggma PASSWORD GGma_23ai !
ALTER CREDENTIALSTORE ADD USER ggadmin@dbwest ALIAS ggwest  DOMAIN
OracleGoldenGate PASSWORD ggadmin
INFO CREDENTIALSTORE

--
-- Add Schematandata, Checkpointtable, and Heartbeattable
--

CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggnorth DOMAIN OracleGoldenGate
ADD SCHEMATRANDATA hr
ADD HEARTBEATTABLE

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggsouth DOMAIN OracleGoldenGate
ADD SCHEMATRANDATA hr
ADD CHECKPOINTTABLE ggadmin.ggs_checkpointtable
ADD HEARTBEATTABLE

CONNECT https://west:9201 DEPLOYMENT depl_west AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggwest DOMAIN OracleGoldenGate
ADD CHECKPOINTTABLE ggadmin.ggs_checkpointtable
ADD HEARTBEATTABLE

--
-- Add Extract and DistPath at source instance
--
```

```
CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggnorth DOMAIN OracleGoldenGate

ADD EXTRACT extn INTEGRATED TRANLOG BEGIN NOW
REGISTER EXTRACT extn database
ADD EXTTRAIL north/ea, EXTRACT extn
START EXTRACT extn

ADD DISTPATH dpns SOURCE trail://north:9002/services/v2/sources?
trail=north/ea TARGET wss://south:9103/services/v2/targets?trail=north/da !
START DISTPATH dpns

INFO ALL
INFO DISTPATH ALL

--
-- Add Replicat, Extract, and DistPath at intermediate instance
--

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggsouth DOMAIN OracleGoldenGate

ADD REPLICAT repn, PARALLEL, EXTTRAIL north/da, CHECKPOINTTABLE
ggadmin.ggs_checkpointtable
START REPLICAT repn

ADD EXTRACT exts INTEGRATED TRANLOG BEGIN NOW
REGISTER EXTRACT exts database
ADD EXTTRAIL south/ea, EXTRACT exts
START EXTRACT exts

ADD DISTPATH dpsw SOURCE trail://north:9102/services/v2/sources?
trail=south/ea TARGET wss://west:9203/services/v2/targets?trail=south/da !
START DISTPATH dpsw

INFO ALL
INFO DISTPATH ALL

--
-- Add Replicat at target instance
--

CONNECT https://west:9201 DEPLOYMENT depl_west AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggwest DOMAIN OracleGoldenGate

ADD REPLICAT reps, PARALLEL, EXTTRAIL south/da, CHECKPOINTTABLE
ggadmin.ggs_checkpointtable
START REPLICAT reps

INFO ALL
INFO DISTPATH ALL

DISCONNECT
```

After creating the OBEY file, create a shell script to run in Admin Client:

```
#!/bin/bash

# Clean up environment
/home/oracle/scripts/misc/cleanup.sh > /dev/null

# Copy parameter file (usually edited with EDIT PARAMs)
cp EXTN.prm /u01/app/oracle/deployments/depl_north/conf/ogg
cp REPN.prm /u01/app/oracle/deployments/depl_south/conf/ogg
cp EXTS.prm /u01/app/oracle/deployments/depl_south/conf/ogg
cp REPS.prm /u01/app/oracle/deployments/depl_west/conf/ogg

# Run the GoldenGate Obey script
echo "obey add_replication_cascading.oby" | adminclient
```

Check a Cascading Environment Replication from Source to Intermediate to Target Server

Copy and use the following OBEY script to check if the replicated data is transmitted from source (dbnorth) to intermediate (dbsouth) and intermediate to the target (dbwest) host.

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
#!/usr/bin/bash

sqlplus -s  /nolog  << EOF

set lines 100
col firstname     format a30
col last_name     format a30
col employee_id   format 9999
col salary        format 999999.99
col department_id format 999

-- Connect to DBNorth
connect  ggadmin/ggadmin@dbnorth

PROMPT
PROMPT Source Database:

select employee_id, first_name, last_name, salary, department_id
  from hr.employees
  where department_id = 60;

-- Connect to DBSouth
connect  ggadmin/ggadmin@dbsouth
```

```
PROMPT Intermediate Database:

select employee_id, first_name, last_name, salary, department_id
  from hr.employees
  where department_id = 60;

-- Connect to DBWest
connect  ggadmin/ggadmin@dbwest

PROMPT Target Database:

select employee_id, first_name, last_name, salary, department_id
  from hr.employees
  where department_id = 60;

EOF
exit
```

Remove the Cascading Environment Set Up Using OBEY

> **Note:**
>
> The given sample script uses names and values of database server, parameter values, Extract, Replicat, and other processes. You must change these values according to your environment for this script to work.

```
--
-- Remove objects from WEST
--

CONNECT https://west:9201 DEPLOYMENT depl_west   AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggwest DOMAIN OracleGoldenGate

KILL REPLICAT reps
DELETE REPLICAT reps

DELETE CHECKPOINTTABLE ggadmin.ggs_checkpointtable !
DELETE HEARTBEATTABLE !

ALTER CREDENTIALSTORE DELETE USER ggadmin@dbwest ALIAS ggwest DOMAIN
OracleGoldenGate

PURGE EXTTRAIL south/da

--
-- Remove objects from SOUTH
--

CONNECT https://south:9101 DEPLOYMENT depl_south AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggsouth DOMAIN OracleGoldenGate
```

```
KILL REPLICAT repn
DELETE REPLICAT repn

STOP DISTPATH dpsw
DELETE DISTPATH dpsw

KILL EXTRACT exts
DELETE  EXTRACT exts

DELETE SCHEMATRANDATA hr
DELETE CHECKPOINTTABLE ggadmin.ggs_checkpointtable !
DELETE HEARTBEATTABLE !

ALTER CREDENTIALSTORE DELETE USER ggadmin@dbsouth ALIAS ggsouth  DOMAIN
OracleGoldenGate

PURGE EXTTRAIL north/da
PURGE EXTTRAIL south/ea

--
-- Remove objects from NORTH
--

CONNECT https://north:9001 DEPLOYMENT depl_north AS ggma PASSWORD GGma_23ai !
DBLOGIN USERIDALIAS ggnorth DOMAIN OracleGoldenGate

STOP DISTPATH dpns
DELETE DISTPATH dpns

KILL   EXTRACT extn
DELETE EXTRACT extn

INFO ALL
INFO DISTPATH ALL

DELETE SCHEMATRANDATA hr
DELETE HEARTBEATTABLE !

ALTER CREDENTIALSTORE DELETE USER ggadmin@dbnorth ALIAS ggnorth DOMAIN
OracleGoldenGate

PURGE EXTTRAIL north/ea

DISCONNECT
```

After creating the OBEY file, create a shell script to run in Admin Client:

```
#!/bin/bash

# Run the GoldenGate Obey script
echo "obey delete_replication_cascading.oby" | adminclient

# Clean up environment
```

```
/home/oracle/scripts/misc/cleanup.sh > /dev/null
```

Data Streams Script

Use this section to copy and test the automation scripts for scenarios where you would need to set up Oracle GoldenGate Data Streams.

The following script performs the following tasks:

- Creates a `USERIDALIAS` to connect Oracle GoldenGate to the database
- Adds TRANDATA
- Creates an Extract
- Adds a user for the Data Stream
- Adds a Data Stream

Data Streams Sample Script

Copy and use the following cURL script to test an Oracle GoldenGate Data Streams environment.

```
#---
------------------------------------------------------------------------------
---------------------
# --
# -- Create USERIDALIAS to connection from GoldenGate to the Databases
# --
#
------------------------------------------------------------------------------
-------------------------

curl -s -k -X POST https://north:9001/services/v2/credentials/
OracleGoldenGate/ggnorth                  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
********************'                                                    \
     -d '{"userid":"ggadmin@dbnorth","password":"***"}' | jq '.messages'

#
------------------------------------------------------------------------------
-------------------------
# --
# -- Add Schematranda/Trandata
# -- Note that the JSON DV and JCT are explictly called for trandata
# --
#
------------------------------------------------------------------------------
-------------------------
```

```
curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/schema  \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
********************'                                                  \
     -d '{"operation":"add","schemaName":"hr"}' | jq '.messages'

curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/table   \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
********************'                                                  \
     -d '{"operation":"add", "tableName":"hr.students_dv"}' | jq '.response'

curl -s -k -X POST https://north:9001/services/v2/connections/
OracleGoldenGate.ggnorth/trandata/table   \
     -H "Content-Type: application/
json"                                                                  \
     -H "Accept: application/
json"                                                                   \
     -H 'Authorization: Basic
********************'                                                  \
     -d '{"operation":"add", "tableName":"hr.demo_jct"}' | jq '.response'

#
------------------------------------------------------------------------------
-------------------------
# --
# -- Add Extracts on source database GGNORTH
# -- Note that the wildcard within the TABLE parameter captures
# --
#
------------------------------------------------------------------------------
-------------------------

curl -s -k -X POST https://north:9001/services/v2/extracts/
EXTN                                          \
     -H 'Content-Type: application/
json'                                                                  \
     -H 'Authorization: Basic
********************'                                                  \
     -d '{"description":"Extract - Region North"
         ,"config":["EXTRACT EXTN"
                   ,"USERIDALIAS ggnorth"
                   ,"EXTTRAIL north/ea"
                   ,"DDL INCLUDE MAPPED"
                   ,"DDLOPTIONS REPORT"
                   ,"REPORTCOUNT EVERY 10 MINUTES, RATE"
                   ,"WARNLONGTRANS 15MINUTES, CHECKINTERVAL 5MINUTES"
```

```
                    ,"TABLE hr.*;"
                    ]
          ,"source": "tranlogs"
          ,"credentials":{"alias":"ggnorth"}
          ,"registration": {"optimized": false}
          ,"begin":"now"
          ,"targets":[{"name":"ea", "path":"north/"}]
          ,"status":"running"
          }' | jq '.messages'

#
------------------------------------------------------------------------------
------------------------
# --
# -- Add User for DataStream
# --
#
------------------------------------------------------------------------------
------------------------

curl -s -k -X POST https://north:9001/services/v2/authorizations/Operator/
dsadmin                         \
     -H 'Content-Type: application/
json'                                                                   \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
********************'                                                   \
     -d '{"credential":"***", "info":"Dedicated DataStream user"}' | jq
'.response'

#
------------------------------------------------------------------------------
------------------------
# --
# -- Add DataStream
# --
#
------------------------------------------------------------------------------
------------------------

curl -s -k -X POST https://north:9002/services/v2/stream/
DS01                                                \
     -H 'Content-Type: application/
json'                                                                   \
     -H "Accept: application/
json"                                                                    \
     -H 'Authorization: Basic
********************'                                                   \
     -d '{"source":{"trail":"ea"
                    ,"path":"north"
                    }
          ,"cloudEventsFormat":false
          ,"encoding":"json"
          ,"bufferSize":1048576
          ,"qualityOfService":"exactlyOnce"
```

```
          ,"description":"Data Stream Test #01"
          }' | jq '.response'

#
------------------------------------------------------------------------------
-------------------------
```