

ORACLE®

Oracle GoldenGate 12c

12.1.2.1 – New Features

Separate Presentation

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- ❑ **Integrated Replicat for Oracle target databases only**
 - ❑ 11.2.0.4 and 12c (12.1.+)
- ❑ **Leverages database parallel apply servers for automatic dependency aware parallel apply**
- ❑ **Minimal changes to replicat configuration**
 - ❑ Single replicat parameter file for all tables
 - ❑ No split transaction semantics

- ❑ Oracle Wallet and Credential Store functionality now built into the Oracle GoldenGate Installation
- ❑ Credential Store for storing usernames and passwords
- ❑ Once a credential has been added to the wallet
 - ❑ Remove USERID, MININGDBUSERID, etc
 - ❑ Replace with USERIDALIAS, MININGDBUSERIDALIAS, etc

❑ Full Integration with ASYNC FSFO

- ❑ GoldenGate can now safely follow bounded data-loss failovers
- ❑ Support enabled in Integrated Extract with the addition of the following parameter:
TRANLOGOPTIONS HANDLEDLFAILOVER

❑ Works for Oracle DB 11g and 12c

❑ Full integration with Oracle's XAG

- ❑ XAG allows you to register a GoldenGate instance to improve HA
- ❑ XAG provides increased availability in the face a loss of an instance or Primary database

❑ DDL Trigger is no longer needed

- ❑ Works with Oracle 11.2.0.4 and up and requires Integrated Extract
- ❑ Works with Oracle Standard Edition as well as Enterprise Edition

❑ DISCARDFILE now has defaults, and no longer needs to be specified for each Replicat

❑ Improved Schema Wildcard resolution within the parameter files

- ❑ Only captures first TABLE parameter for SCOTT.EMP DML

```
TABLE SCOTT.EMP, COLMAP(...);
```

```
TABLE *.EMP;
```

❑ Oracle 12c Expanded Data Type Support

- ❑ Support for VARCHAR2 / NVARCHAR2 / RAW MAX options (32k length)

12.1.2.1 - Major Enhancements

❑ Extract Enhancements

- ❑ Integrated Extract Enhancements
- ❑ Certification for Oracle 12.1.0.2 and In-Memory Database (IMDB)
- ❑ Support for Capturing from ADG Standby database

❑ Integrated Delivery Enhancements

- ❑ Dependency Aware Batching
- ❑ DDL and DML Handlers
- ❑ Error Queue Support

❑ Support for multiple Editions (Edition Based Redefinition)

❑ Column Level Character Set Support

❑ SOCKS 5 Support

12.1.2.1 - Integrated Capture Enhancements

- ❑ **Continues to support Oracle SE and EE databases**
- ❑ **Improved Startup Performance and Scalability (shared mining dictionary)**
- ❑ **Tagged transaction can be excluded for Active-Active replication**
 - ❑ EXCLUDETAG
- ❑ **Create Table As Select... can be applied as DDL + DML rather than DDL**
 - ❑ TRANLOGOPTIONS GETCTASDML
- ❑ **Added redo log capture for ANYDATA and UDTs**
 - ❑ TRANLOGOPTIONS USENATIVEOBSUPPORT
- ❑ **Support for Edition Based Redefinition and multiple editions**

- ❑ **Extract can be configured to run on the Standby Database**

- ❑ **Configuration on the Primary database**

- ❑ Setup DDL capture (optional)
- ❑ Configure supplemental log data

- ❑ **Configuration on the Standby database**

- ❑ USERID Parameter points to the Primary database (USERID username@primary)
- ❑ Set TRANLOGOPTIONS MINEFROMACTIVEDG

12.1.2.1 - Classic Extract Mining Active Data Guard (1)

- ❑ Extract can be configured to run on the Standby Database
- ❑ Prepare Primary database
 - ❑ Setup DDL capture if needed
 - ❑ Supplemental log data
- ❑ Create Extract on Active Data Guard instance
 - ❑ ADD EXTRACT
 - ❑ Parameter
 - ❑ USERID username@standby PASSWORD xxx
 - ❑ TRANLOGOPTIONS **MINEFROMACTIVEDG**
 - ❑ START EXTRACT

12.1.2.1 - Classic Extract Mining Activ Data Guard (2)

- ❑ Explicit specify the ADG mode in parameter file
- ❑ Number of redo threads has to match the number of nodes from Primary
- ❑ No new RAC instance can be added, data will be ignored
- ❑ Definition of Redo/Archive has to be exactly the same
- ❑ User intervention for role transitions
- ❑ GGSCI has to be able to connect to the primary
- ❑ Support 10.2+

12.1.2.1 - Shared Logminer Dictionary (IE)

- ❑ REGISTER EXTRACT ecap DATABASE

- ❑ REGISTER EXTRACT ename DATABASE SHARE ecap
 - ❑ Ename is created as a “clone” of ecap
 - ❑ 2nd extract (ename) uses same internal dictionary as ecap
 - ❑ Fast start of 2nd extract (no dictionary processing required)
 - ❑ Single extract does dictionary maintenance

- ❑ REGISTER EXTRACT eother DATABASE SCN startatscn SHARE ecap
 - ❑ SCN parameter meaning is different when combined with SHARE

12.1.2.1 - EXCLUDETAG Functionality (IE & CE)

- ❑ TRANLOGOPTIONS EXCLUDETAG takes a single string value, but allows multiple lines to specify multiple tags

- ❑ Extend EXCLUDETAG to exclude any tagged operation
 - ❑ EXCLUDETAG +
 - ❑ Similar to Streams is_null_tag setting.

- ❑ Filtering of tagged transactions can be done in the Extract, Pump and REPLICAT

12.1.2.1 - Dependency-Aware Batching (IR)

- ❑ **Through the use of INTEGRATEDPARAMS BATCHSQL_MODE**
 - ❑ Controls the ordering of transactions in BATCHSQL mode
 - ❑ Options:
 - ❑ **SEQUENTIAL** – transaction batched in sequential order
 - ❑ **DEPENDENT** – Dependency grouping, schedule when no active dependencies
 - ❑ **DEPENDENT_EAGER** – dependency grouping but allow scheduling when there are active dependencies
 - ❑ Default is **DEPENDENT** for Oracle 12.1.0.2
 - ❑ Requires new OGG/RDBMS bundled patch (bp2) but not available for 11.2.0.4.
 - ❑ Without patch, default is **SEQUENTIAL**

- ❑ **COMMIT_SERIALIZATION=FULL sets BATCHSQL_MODE=SEQUENTIAL**

12.1.2.1 - Apply Handler Configuration (IR)

- ❑ **Uses the same package calls to set up as Streams does**
 - ❑ DBMS_APPLY_ADM package
 - ❑ DML: Set_dml_handler or Add_stmt_handler
 - ❑ DDL: Alter_apply
 - ❑ The scope of handler is dependent on the configuration
 - ❑ Per Table , Per Operation (Insert/Update/Delete)
 - ❑ It is associated with the Inbound Server
(Integrated Replicat process inside the database)
 - ❑ Operations processed by the DML/DDL handler will not be applied by the Replicat
- ❑ **Integrated Replicat needs to be stopped and restarted when adding or removing handlers.**

PL/SQL Update Handler on DEMO.ORDERS table

```
BEGIN
  DBMS_APPLY_ADM.SET_DML_HANDLER(
    object_name => '"DEMO"."ORDERS"',
    object_type => 'TABLE',
    operation_name => 'UPDATE',
    error_handler => FALSE,    ## if FALSE, then the handler replaces normal apply processing,
                              ## if TRUE, then the handler is only executed on error.
    user_procedure => 'DEMO.ORDERS DML HANDLER',
    apply_database_link => NULL,
    apply_name => NULL);    ## If NULL, then handler is used for ALL apply & inbound servers
  END;
/
```


12.1.2.1 - Statement DML Handlers (IR)

- ❑ **Statement DML handlers are up to 4x faster than procedural DML handlers**
 - ❑ Statement DML handlers should be used to replace SQLEXEC in the Replicat when possible
- ❑ **Easy to Use**
 - ❑ SQL statements, rather than PL/SQL procedures
 - ❑ **DBMS_APPLY_ADM.ADD_STMT_HANDLER**
 - ❑ Creates handler with SQL statement AND
 - ❑ Registers to Apply process
 - ❑ **DBMS_STREAMS_HANDLER_ADM** package procedures
 - ❑ Create or Drop handler
 - ❑ Add or Remove statements to/from handler
 - ❑ Register with apply

12.1.2.1 - Enable Error Queue Handling (IR)

- ❑ In older versions of OGG, if an error occurs it falls back and lets the Replicat retry the operation. If the OGG retry fails it abends

- ❑ Allow `DBMS_APPLY_ADM.EXECUTE_ERROR` capability for Integrated Replicat to retry operations in the error queue. Handles whether is message is added to the error queue.
 - ❑ `DBOPTIONS_NO_DISABLE_ON_RETRY_ERROR`
 - ❑ Allow OGG to retry, but if OGG fails, continue processing. If OGG successfully applies transaction, OGG deletes error from queue. Default behavior.
 - ❑ `DBOPTIONS_NO_DISABLE_OR_RETRY_ERROR`
 - ❑ Disable OGG retry and continue processing, recommended with `COMMIT_SERIALIZATION=FULL`

12.1.2.1 - Managing Apply Errors - 1 (IR)

Oracle Enterprise Manager (SYSMAN) - View Details: OGG\$RORCL_3 - GoldenGate Apply (apply) - Mozilla Firefox

https://slc01mix.us.oracle.com:4473/em/faces/sdk/nonFacesWrapper?_em.coBM=/console/targets%24ctxType%3DDatabases&_afLoop=687172902826

ORACLE Enterprise Manager Cloud Control 12c

Enterprise Targets Favorites History Search Target Name

waa3_adc6170412.us.oracle.com Logged in as ggadm | adc6170412.us.oracle.com

Manage Replication > View Details: OGG\$RORCL_3 - GoldenGate Apply (apply) Logged in as GGADM

View Details: OGG\$RORCL_3 - GoldenGate Apply (apply)

Overview Configurations Rules Statistics

Last Refresh **September 19, 2014 11:51:38 PM PDT** Refresh View Data Real Time: 1 Minute Refresh

General

Status Queue GGADM.OGGQ\$RORCL_3
Apply User GGADM Source Database NULL
Purpose GoldenGate Apply
Apply Tag 076079

State

Reader IDLE
Coordinator IDLE
Server IDLE(12)

Errors

Transaction Errors 1 Apply Errors: Error Number n/a Error Message n/a
Transaction Errors

Retry Transaction Delete Retry all Transactions Delete All

Select All Select None														
Select	Transaction ID		Source Database	Commit SCN	Message		Error			Objects				View Error LCRs
	Local	Source			Number	Count	Number	Message	Error Type	Owner	Name	Primary Key	Operation	
<input type="checkbox"/>	10.15.89	9.27.2515	NULL	0	1	1	1	ORA-00001: unique constraint (.) violated ORA-0000		DEMO	ORDERS		INSERT	

12.1.2.1 - Managing Apply Errors - 2 (IR)

The screenshot shows the Oracle Enterprise Manager (SYSMAN) interface in a Mozilla Firefox browser. The page title is "Compare Values: OGG\$RORCL_3". The breadcrumb navigation is "Manage Replication > View Apply Details > View Error LCRs > Compare Values: OGG\$RORCL_3". The error message is "Error ORA-00001: unique constraint (.) violated ORA-00001: unique constraint (DEMO.SYS_C004972) violated".

Column Name	Column Type	Old Value	New Value	Current Value
STATUS	SYS.VARCHAR2		PENDING	MakeItFail
ORDER_NUMBER	SYS.VARCHAR2		1008	1008
DELIVERY_DATE	SYS.DATE		19-SEP-2014 06:57:11	19-SEP-2014 18:55:37
PART_NUMBER	SYS.VARCHAR2		789	9999

TIPS

- Old Value shows the old column value in the row LCR. This is the column value for the row before the DML change.
- New Value shows the new column value in the row LCR. This is the column value for the row after the DML change.
- Current Value shows the column value in the row at the destination database. This is the row that will be modified by the row LCR when the apply process applies the change.

12.1.2.1 - Edition Based Redefinition (IR)

- ❑ **DDL Replication now supports CREATE/DROP EDITION**
 - ❑ Replicat will grant the user permission to use if it exists on target
- ❑ **Extract will capture the EDITION NAME owner**
- ❑ **Replicat will switch session to the EDITION owner before applying DDL**
- ❑ **DDL operations on editions can be filtered as well**
 - ❑ DDL INCLUDE ALL, EXCLUDE OBJTYPE EDITION

12.1.2.1 - Support for Column Level Character Sets

- ❑ For cases where a table has column(s) with a character set that is different from the database character set.

- ❑ Use **SOURCECHARSET** to enable this functionality
 - ❑ In MAP / TABLE statements use CHARSET to use your own settings
 - ❑ In DEFGEN use COLCHARSET to use your own settings

❑ SOCKS v5 Support

- ❑ SOCKet Secure is a protocol that supports routing between client and server
- ❑ Allows authentication
- ❑ SOCKS can encrypt all traffic between client and server
- ❑ Alternative to VPN for cloud to on-premise or vice-versa

❑ New parameter SOCKSPROXY

- ❑ SOCKSPROXY host:port, [PROXYCSALIAS <alias> [, PROXYCSDOMAIN domain]]

12.1.2.1 - Enhanced Cloud Support - Example

- ❑ **Example for sending trail data from on-premise to cloud.**
 - ❑ GoldenGate installed on cloud-server.oracle.com with manager port 9000
 - ❑ Firewall only allows incoming connections on SSH port.

- ❑ **Use SSH as SOCKS proxy server on-premise**
 - ❑ `ssh -i ssh-key -N -f -D 1080 cloud-user@cloud-server.oracle.com`
 - ❑ Port 1080 is the client port that will route to an OGG installation on **cloud-server.oracle.com**

- ❑ **Extract Parameter file:**
 - ❑ RMTHOST cloud-server.oracle.com, MGRPORT 9000, SOCKSPROXY localhost:1080

Agenda

- 1 Oracle GoldenGate 12c
- 2 Oracle GoldenGate 12.1.2 Review
- 3 Oracle GoldenGate 12.1.2.1 New Features → separate PPTX
- 4 Streams to GoldenGate Conversions
- 5 **Q&A**

Questions and Answers



Resources

Oracle Data Integrator



Oracle Data Integration

Oracle GoldenGate



Oracle Data Integration

Oracle Enterprise Data Quality



ORCL DataIntegration

Oracle Enterprise Metadata Management



blogs.oracle.com/dataintegration

Oracle Data Services Integrator



OracleGoldenGate

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Data Integration

<http://www.oracle.com/us/products/middleware/data-integration/overview/index.html>

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