Replicate Data Between Environments

Oracle GoldenGate 12c

Eric Rudie
Master Principal Sales Consultant
Oracle Public Sector
28 September 2016
Safe Harbor Statement

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Program Agenda

1. Oracle GoldenGate Overview
2. Oracle GoldenGate 12.2
3. Oracle GoldenGate for Big Data
4. Oracle GoldenGate Foundation Suite
5. Oracle GoldenGate Cloud Service
Program Agenda

1. Oracle GoldenGate Overview
2. Oracle GoldenGate 12.2
3. Oracle GoldenGate for Big Data
4. Oracle GoldenGate Foundation Suite
5. Oracle GoldenGate Cloud Service
Evolution

Evolution of Oracle GoldenGate Platform (20 Years)

- Introduced world class Transactional Data Management Solution
- Performance, Ease of Use, Heterogeneity
- Usability, Manageability, Cloud and Big Data
- IT GETS BETTER
Oracle GoldenGate

Use cases

- Fully Active Distributed DB
- High Availability & Disaster Recovery
- New DB/HW/OS/APP
- Zero Downtime Upgrades & Data Migration
- Global Data Centers
- Data Synchronization Across the Enterprise
- Big Data, DW & Marts
- Real-time BI, Hadoop Data Staging, Data Ingestion
- Application Offloading
- Query & Report Offloading
- Message Bus & Data Grid
- Event Driven Architecture, SOA/JMS, Coherence
- Data Streaming
- Real-time Analytics & Massive Parallelization

Real-time Data Delivery
Oracle GoldenGate Flexible Deployment Models

Operational Reporting

Migrations, Continuous Availability

Load Balancing

Information Hubs

Real-time Data Warehousing

Streaming Analytics

Event Processing
Oracle GoldenGate Modular Architecture

Databases → Capture → Trail Files → Network Firewall Cloud → Trail Files → Delivery

- Bi-Directional
- High Performance
- Low Impact and Non-Intrusive
- Flexible and Heterogeneous
- Resilient and FIPS Secure
- Big Data and Cloud Ready

Databases
Big Data
Messaging
Program Agenda

1. Oracle GoldenGate Overview
2. Oracle GoldenGate 12.2
3. Oracle GoldenGate for Big Data
4. Oracle GoldenGate Foundation Suite
5. Oracle GoldenGate Cloud Service
Oracle GoldenGate 12.1

**Optimized for Oracle Database 12c**
Multitenant and Cloud-based Real-Time Replication

**Integrated Delivery for the Oracle Database**
Leveraging lightweight Streaming API built Exclusively for Oracle GoldenGate

**Coordinated Delivery for All Databases**
Orchestrates the High-Speed Apply Processes & Simplifies Setup and Management

**Improved Ease of Use**
Automatic Discard File, Enhanced Debugging, and Schema Wildcarding

**Expanded Heterogeneity**
12c Brings Support for New Databases and Enhancements to Existing Supported Platforms

**Enhanced High Availability**
Integration with Data Guard FSFO for Automated & Transparent failover of Components

**Tighter Security**
Integration with the Oracle Credential Store and Oracle Wallet for encrypted user details

**Expanded Oracle Application and Technology Support**
Active/Active ATG, Low Downtime E-Business Suite Migrations and Coherence Integration
Business Goals for Oracle GoldenGate 12.2

Usability

Manageability

Improved Performance

Optimized for Big Data and Cloud
Oracle GoldenGate 12.2

Metadata in Trail (Goodbye SOURCEDEFS)
Self Describing Trail files for Simplified User Experience

Parameter Simplification
Verify run-time Parameters and Parameter Check Utility for Productivity and Operational Simplicity

Automatic Heartbeat
Real-time end-to-end replication lag Operational Ease of Use

Big Data Support Out of the Box
Brand new Replicat for Big Data targets to enable seamless integration with Big Data

Expanded Heterogeneity
Brings Support for New Databases and Enhancements to Existing Supported Platforms

Cloud Ready
GoldenGate Cloud Service

Enhanced Monitoring and Performance
New Metrics for Diagnostics and Reduced CPU Usage for Extract and Replicat

Expanded Oracle Support
Invisible Column support, Datapump and Clusterware Integration
Program Agenda

1. Oracle GoldenGate Overview
2. Oracle GoldenGate 12.2
3. Oracle GoldenGate for Big Data
4. Oracle GoldenGate Studio
5. Oracle GoldenGate Cloud Service
Oracle GoldenGate for Big Data 12.2

Heterogeneous Databases

Capture → Trail Files → Network Firewall Cloud → Trail Files → Java enabled Replicat

Parameter File | Adapter Properties | JAR

Flume | HBASE | HDFS | Kafka | NoSQL
Dedicated Replicat
Java Enabled Replicat for seamless end-to-end Big Data Integration

Declarative Design
No hand coding of Java to simplify mappings

Broad Target Type Support
Supports Hbase, Hive, HDFS, Flume and Kafka OOTB but can be easily extended

Extensible and Customizable format support
Supports AVRO, JSON and XML OOTB but can easily be customized
Program Agenda

1. Oracle GoldenGate Overview
2. Oracle GoldenGate 12.2
3. Oracle GoldenGate for Big Data
4. Oracle GoldenGate Foundation Suite
5. Oracle GoldenGate Cloud Service
Oracle GoldenGate Foundation Suite

OGGFS - New Package

• Oracle GoldenGate Foundation Suite includes:
  1. OGG Studio - Only way to purchase OGG Studio
  2. OGG Veridata
  3. OGG Management Pack (EM Plug-in, Monitor, Director)

• Previous purchase of 2 & 3 can be used toward OGGFS upon approval
(OGGFS) Oracle GoldenGate Studio

We Want to Help You Make Your Real-Time Enterprise a Reality

• Improve IT productivity by reducing the time to design and deploy new replication solutions.

• Best practice wizards with templates and auto mapping make real-time data integration easier to deploy throughout the enterprise.

• Allows development, QA and production teams to work off of the same page ensuring continuity.

• All changes and history are stored securely in a central database repository.
GoldenGate Studio

Design Once; Deploy to Many

Design

One Click
To Testing
To Production

Deploy
Oracle GoldenGate Studio

Separating Logical From The Physical

1. One Project contains many Solutions
2. Solutions contain one Logical Design and many Physical Deployments
3. Global Resources are shared across projects
Oracle GoldenGate Studio

Product Architecture for Online Deployments

Oracle GoldenGate Studio
12.2.1 (Java)

OGG Studio Repository
(Oracle only)

Monitor

Deploy

JAgent
12.2.1

Metrics (REST via OGG Manager Port)

/.dirtmp Backup directory

/.dirprm Config file directory

/.diroby Command file directory

GLOBALS Global parameters file

ggsci Add table logging. Add, stop and start capture, pump, apply, & initial load

Oracle GoldenGate
12.2.0
(OGGFS) Oracle GoldenGate Management Pack

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Status of replication components – Up or Down?</td>
<td>• Change the Status of replication components – Start and Stop</td>
</tr>
<tr>
<td>• Time lag between those components – How far behind?</td>
<td>• Reconfigure components – increase parallelism, tweak parameters</td>
</tr>
<tr>
<td>• Warning and error messages – Do I need to be concerned?</td>
<td>• View all warning and error messages - see what led up to event</td>
</tr>
<tr>
<td>• Transaction volumes – How much data?</td>
<td>• Audit management activity – who did what and when?</td>
</tr>
</tbody>
</table>
(OGGFS) EM Plug-in
(OGGFS) Oracle GoldenGate Monitor / EM Plug-in

Architecture

E-mail
External Monitoring System
CLI

EM/ Monitor Server

Web Client

HTTP/ HTTPS
SMTP
SNMP
Exec

Repository

Oracle GoldenGate Instance

EM / Monitor Agent
Manager
Capture

Oracle GoldenGate Instance

EM / Monitor Agent
Manager
Delivery

GoldenGate

E-mail
External Monitoring System
CLI

Repository

GoldenGate
(OGGFS) Oracle GoldenGate Veridata

Top Reasons We See Why Data Goes Out of Sync

1. Human Error. We work in very complex, error prone environments
2. Source data is unknowingly corrupted
   – You inherited bad data
   – Out of bounds Globalization characters & bad dates become NULLs during DB copy
3. Target data is accidentally deleted or updated outside of replication
4. "Nologging" set for source transactions
5. Gaps during data instantiation
6. Application upgrades not coordinated between source and target
(OGGFS) Oracle GoldenGate Veridata

Overview

- High-speed heterogeneous data comparison and repair
- Works with or without Oracle GoldenGate data replication
  - Can import OGG table mappings
- Low impact
  - No table locking
  - Data hashing, sorting, and comparison happen outside the database
  - Supports data subsetting
- Maintains comparison audit history and detailed statistics
- Delta Comparisons for tables with Update Timestamp, ora_rowscn, and custom logic
- LDAP/Single sign on integration
(OGGFS) Oracle GoldenGate Veridata

Summarize and Repair Out of Sync Data

### Job testJobRepairJob

<table>
<thead>
<tr>
<th></th>
<th>COMPAR Plan</th>
<th>Items</th>
<th>Inserts</th>
<th>Updates</th>
<th>Deletions</th>
<th>Bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Out-Of-Sync</td>
<td>7</td>
<td>1462</td>
<td>155</td>
<td>1135</td>
<td>142</td>
<td></td>
</tr>
<tr>
<td>Repeated</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Failed Repair</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Not Repaired</td>
<td>7</td>
<td>1462</td>
<td>155</td>
<td>1135</td>
<td>142</td>
<td></td>
</tr>
</tbody>
</table>

#### Repair Configuration Options

- Database User Name: [Field]
- Password: [Field]
- Job Profile: [Default]

#### Repair Groups

- [Group 1]
- [Group 2]
- [Group 3]

#### Out-Of-Sync Rows Details

<table>
<thead>
<tr>
<th>Select</th>
<th>Status</th>
<th>Operation</th>
<th>ALL Columns</th>
<th>ORIG_COL (VARCHAR)</th>
<th>ORIG_COL (VARCHAR)</th>
<th>ORIG_COL (VARCHAR)</th>
<th>ORIG_COL (VARCHAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>ALL_COLUMNS</th>
<th>ALL_COLUMNS</th>
<th>ALL_COLUMNS</th>
<th>ALL_COLUMNS</th>
<th>ALL_COLUMNS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
<td>ALL_COLUMNS</td>
</tr>
</tbody>
</table>
(OGGFS) Oracle GoldenGate Veridata

Architecture

Source Database

GoldenGate

Target Database

Veridata Agent

Agent Hashes Row & Sends PK + Hash

Veridata Agent

Web Client

HTTP

Server Sorts Rows, Compares Hash, Generates COOS

Veridata Web Server

Run Compare CLI (Vericom)

XML File Upload API (Scripting)

Veridata Repository

JDBC

TCP/IP / SSL

JDBC

JDBC

TCP/IP / SSL

Web Server Sorts Rows, Compares Hash, Generates COOS

XML File Upload API (Scripting)

Run Compare CLI (Vericom)

Veridata Web Server

Veridata Agent

Agent Hashes Row & Sends PK + Hash

Veridata Agent

Source Database

Target Database
Program Agenda

1. Oracle GoldenGate Overview
2. Oracle GoldenGate 12.2
3. Oracle GoldenGate for Big Data
4. Oracle GoldenGate Foundation Suite
5. Oracle GoldenGate Cloud Service
Oracle Cloud Strategy

Industry’s Most Comprehensive Cloud Platform Strategy

Bring Oracle’s leading Database and Middleware Technology Software to customers and partners anywhere in the World through the Internet
Oracle GoldenGate Cloud Service

Use cases

Capture Trail Pump Route Deliver

Real-time Data Delivery

GoldenGateCloud Service

Cloud Onboarding

Global Access

Operational Efficiency

Big Data, DW & Marts

Business Continuity

New Application Onboarding

Query & Report Offloading to Cloud

Live Development and Testing in Cloud

Real-time BI, DW and Data Marts

Zero Downtime Migration
NEW: Oracle GoldenGate Cloud Service

**GoldenGate Cloud Service**
- Available in the Public Cloud via Subscription or Hourly basis

**Key Benefits**
- Oracle Database Cloud Service delivery via GoldenGate
- Exadata Cloud Service delivery via GoldenGate
- Big Data Cloud Service delivery to Hadoop and NoSQL

**3rd Party Cloud**
- More Choices run as BYOL on other Clouds for delivery to any supported Database
Questions
Safe Harbor Statement

The preceding is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.