Performing Initial Load

by Ahmed Baraka

Introduction to Oracle Data Guard
In this lecture, we are going to talk about the basic concepts of Oracle Data Guard

Objectives

By the end of this lecture, you should be able to:

- Understand what is Initial Load
- Specify the options to implement the Initial load
- List the Oracle GoldenGate Initial Load Methods and understand the difference between each other

Configuring Oracle GoldenGate Roadmap

1. Prepare the environment
2. Configure Initial Load
3. Configure the Change Synchronization:
   a) Configure the Extract (Change Capture)
   b) Configure the Replicate (Delivery)

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Oracle Database Administrator

Overview of the Initial Load Procedure

- Load data into the target database tables in preparation for change synchronization with Oracle GoldenGate. Also called "Instantiation".

- Initial Load can be done via:
  - Database utilities (homogenous databases). In Oracle: RMAN, SQL*Loader, Data Pump, transportable tablespaces, and SQL language
  - Oracle GoldenGate (heterogeneous databases)

Initial Load Challenge

- Insure no collisions or data loss will occur when applying the change data after the initial load

- Two approaches in Oracle GoldenGate:
  - Conflicts free:
    - Disable updates during initial load
    - Apply the change data to the target at the appropriate CSN

  - Conflicts cannot be avoided:
    - After the initial load finishes, ignore the conflicts for a while

Advantages of Oracle GoldenGate Initial Load

- Work across heterogeneous databases types and platforms
- Read directly from source tables without locking tables
- Flexible load alternatives, including native bulk load utilities
- Change delivery can handle collisions with initial load
- GoldenGate initial load throughput can be improved by using multiple pairs of Extract-Replicat processes

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Oracle Database Administrator

Limitations of Oracle GoldenGate Initial Load

- Inefficient for large data
    - size of source tables
    - distance between databases
    - disk space

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Oracle GoldenGate Initial Load Prerequisites

- Disable DDL processing.
- Prepare the target tables
  - Drop unused columns

```
ALTER TABLE … DROP UNUSED COLUMNS;
```

  - Disable foreign-key and check constraints, and the triggers
  - Remove the indexes
- Configure the Manager process
- Create a data definitions file (if needed)
- Create change-synchronization groups

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Using Oracle GoldenGate Initial Load Plan

1. Start the change synchronization Extract
2. Start the initial load Extract
3. Wait for the initial load Replicat to complete
4. Start the change synchronization Replicat

Oracle GoldenGate Initial Load Methods

- Direct load
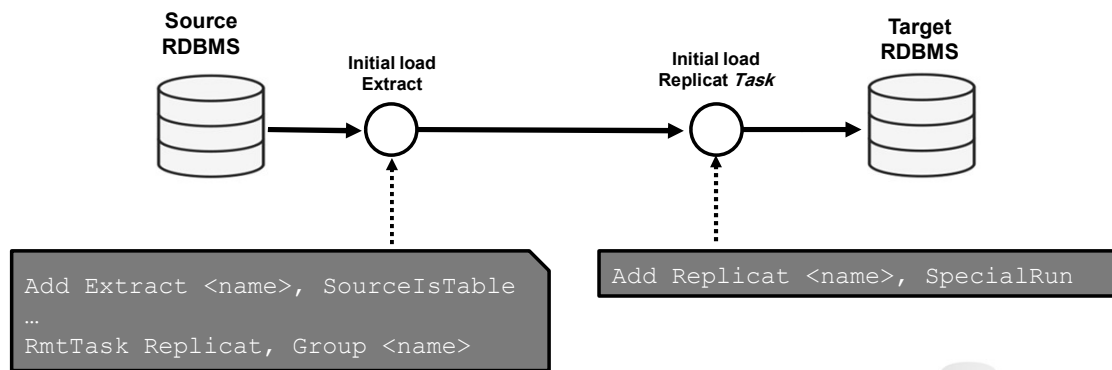- File to Replicat
- File to database utility
- Direct bulk load

Trail File Formats

- Canonical
- FormatASCII
- FormatSQL
- FormatXML
- Logical Change Records (LCRs)

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Initial Load Methods: Direct Load

**Source
RDBMS**

**Initial load
Extract**

**Initial load
Replicat *Task***

**Target
RDBMS**

```
Add Extract <name>, SourceIsTable
…
RmtTask Replicat, Group <name>
```

```
Add Replicat <name>, SpecialRun
```
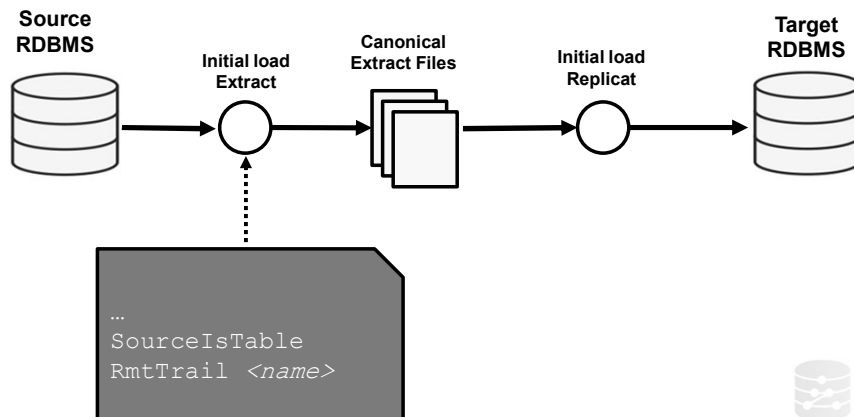
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Initial Load Methods: Direct Load

- **Features**:
  - Data sent directly from Extract to Replicat *Task*
  - Transformation in Extract and/or Replicat

- **Pros**:
  - Data delivered in large blocks
  - No intermediate trail

- **Cons**:
  - Does not supports LOBs, LONG, UDT, and XML
  - Encryption is not supported
  - Constraints on compressed tables

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Initial Load Methods: File to Replicat

Source RDBMS

Initial load Extract

Canonical Extract Files

Initial load Replicat

Target RDBMS

```
…
SourceIsTable
RmtTrail <name>
```

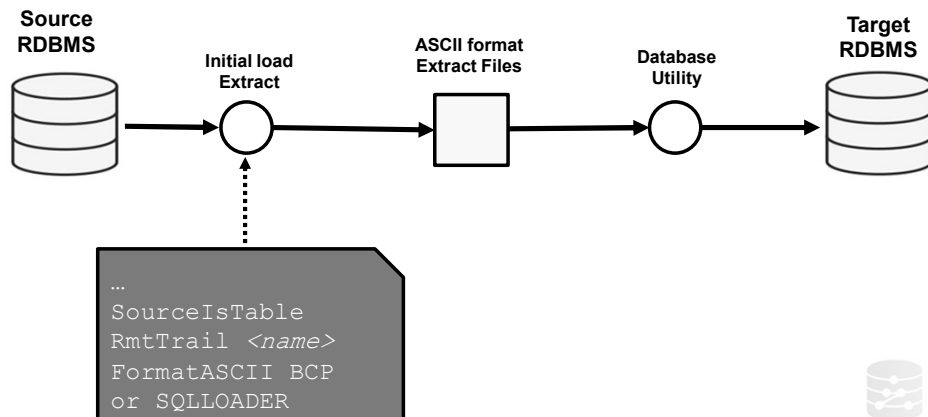Ahmed Baraka
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Initial Load Methods: File to Replicat

- **Features**:
  - Initial load Extract writes to an extract file in canonical format
  - Transformation in Extract and/or Replicat
- **Pros**:
  - supports the extraction of LONG and LOB data
- **Cons**:
  - The least efficient

Initial Load Methods: File to Database Utility

Source RDBMS

Initial load Extract

ASCII format Extract Files

Database Utility

Target RDBMS

```
…
SourceIsTable
RmtTrail <name>
FormatASCII BCP
or SQLLOADER
```
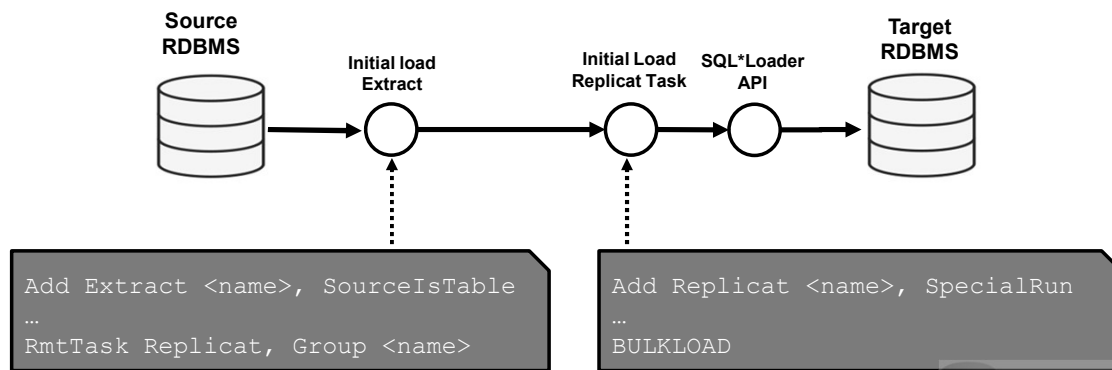
Initial Load Methods: File to Database Utility

- **Features**:
  - Initial load Extract writes to ASCII format extract files
  - Supports: SQL*Loader, Microsoft BCP, DTS, or SQL Server SSIS, IBM Load Utility (LOADUTIL)
  - Transformation in Extract only
- **Pros**:
  - More efficient than File to Replicate method
- **Cons**:
  - Non-ASCII data is not supported
  - Data must be supported by the utility

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Initial Load Methods: Direct Bulk Load

Source RDBMS

Initial load Extract

Initial Load Replicat Task

SQL*Loader API

Target RDBMS

```
Add Extract <name>, SourceIsTable
…
RmtTask Replicat, Group <name>
```

```
Add Replicat <name>, SpecialRun
…
BULKLOAD
```

Initial Load Methods: Direct Bulk Load

- **Features**:
  - Replicat task interfaces with the API of SQL*Loader
  - Transformation in Extract and/or Replicat

- **Pros**:
  - The most efficient GoldenGate initial load method

- **Cons**:
  - Works only with Oracle databases
  - LOBs or LONG data-types are not supported

Improving the Performance of an Initial Load

- Build up a set of initial load Extract-Replicat pairs. Distribute the load on each pair
- Use the TCPBUFSIZE option of the RMTHOST

Summary

By the end of this lecture, you should have learnt how able to:

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