

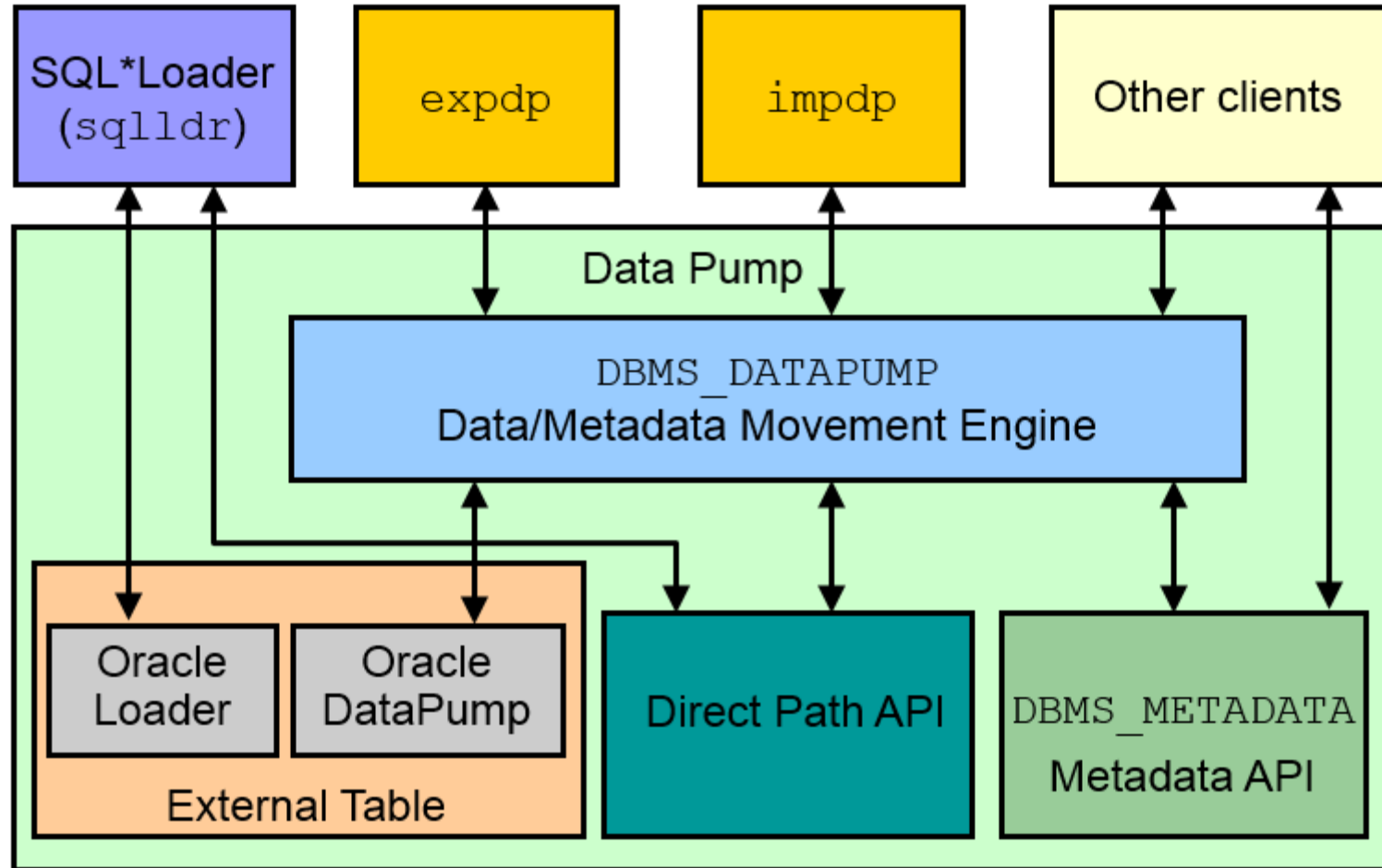
Moving Data

Objectives

- After completing this lesson, you should be able to:
 - Describe ways to move data
 - Explain the general architecture of Oracle Data Pump
 - Use Data Pump Export and Import to move data between Oracle databases
 - Use SQL*Loader to load data from a non-Oracle database (or user files)
 - Use external tables to move data via platform-independent files
 - Describe methods that can be used to migrate databases to Oracle Database Cloud Service



Moving Data: General Architecture



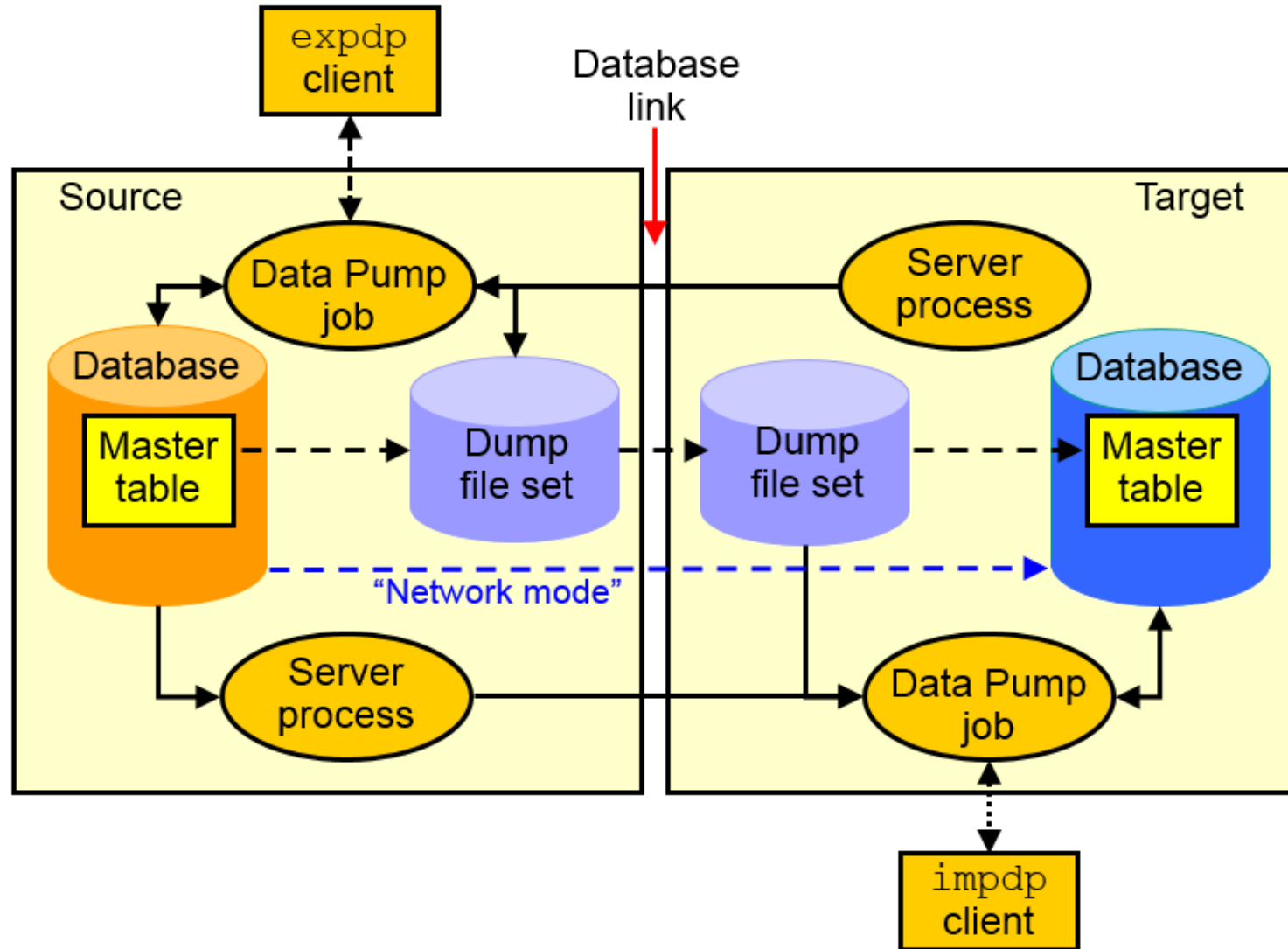
Oracle Data Pump: Overview

- As a server-based facility for high-speed data and metadata movement, Oracle Data Pump:
 - Is callable via `DBMS_DATAPUMP`
 - Provides the following tools:
 - `expdp` and `impdp`
 - GUI interface in Enterprise Manager Cloud Control
 - Provides several data movement methods:
 - Conventional path load
 - Direct path
 - External tables
 - Transportable tablespace
 - Network link support
 - Detaches from and reattaches to long-running jobs
 - Restarts Data Pump jobs

Oracle Data Pump: Benefits

- Data Pump offers many benefits and features, such as:
 - Fine-grained object and data selection
 - Explicit specification of database version
 - Parallel execution
 - Network mode in a distributed environment
 - Remapping capabilities
 - Data sampling and metadata compression
 - Compression of data during a Data Pump export
 - Security through encryption
 - Ability to export XMLType data as CLOBs

Data Pump Export and Import Clients



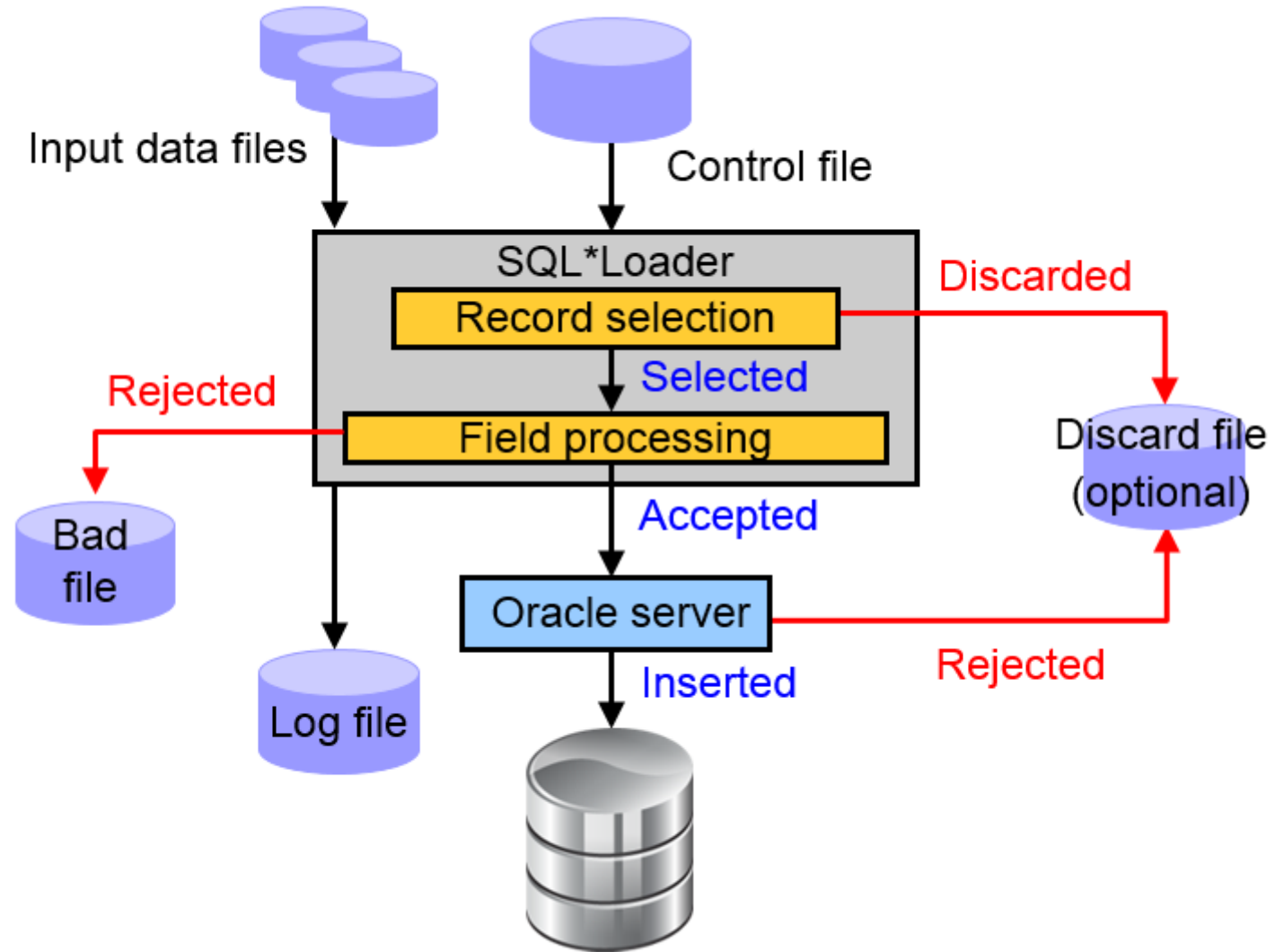
Data Pump Interfaces and Modes

- Data Pump Export and Import interfaces:
 - Command line
 - Parameter file
 - Interactive command line
 - Enterprise Manager Cloud Control
- Data Pump Export and Import modes:
 - Full
 - Schema
 - Table
 - Tablespace
 - Transportable tablespace
 - Transportable database

Data Pump Import Transformations

- You can remap:
 - Data files by using `REMAP_DATAFILE`
 - Tablespaces by using `REMAP_TABLESPACE`
 - Schemas by using `REMAP_SCHEMA`
 - Tables by using `REMAP_TABLE`
 - Data by using `REMAP_DATA`
 - Directory by using `REMAP_DIRECTORY`

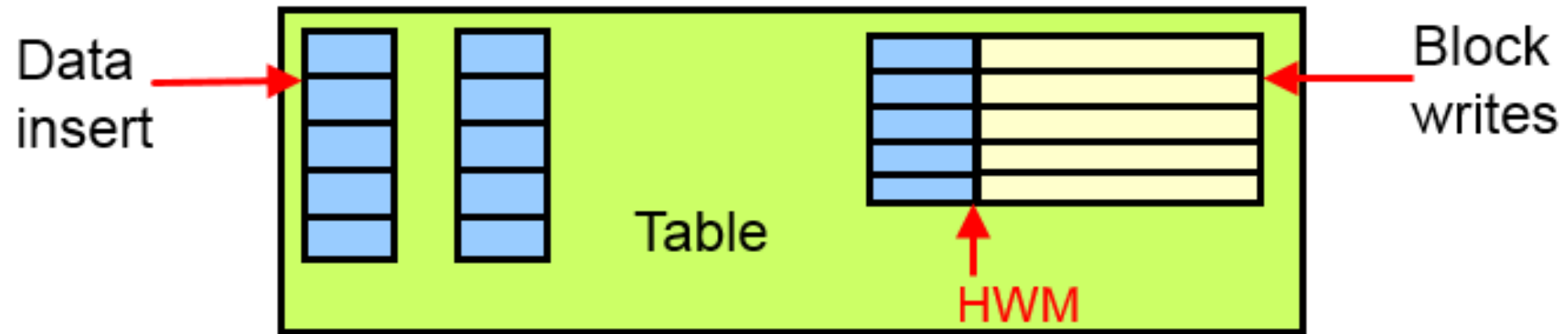
SQL Loader: Overview



Comparing Loading Methods

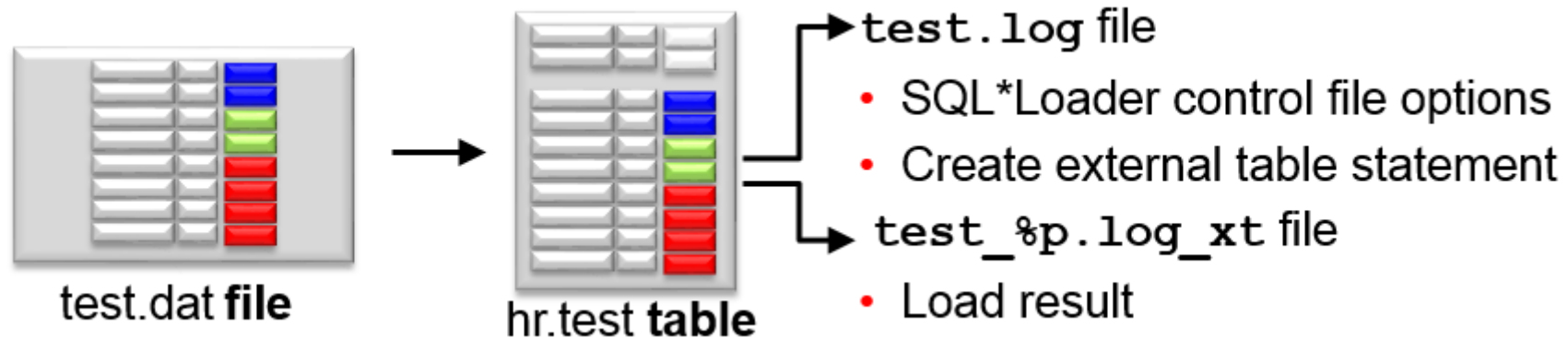
Conventional Load	Direct Path Load
Uses <code>COMMIT</code>	Uses data saves (faster operation)
Always generates redo entries	Generates redo only under specific conditions
Enforces all constraints	Enforces only <code>PRIMARY KEY</code> , <code>UNIQUE</code> , and <code>NOT NULL</code> constraints
Fires <code>INSERT</code> triggers	Does not fire <code>INSERT</code> triggers
Can load into clustered tables	Does not load into clusters
Allows other users to modify tables during load operation	Prevents other users from making changes to tables during load operation
Maintains index entries on each insert	Merges new index entries at the end of the load

Data Save Feature

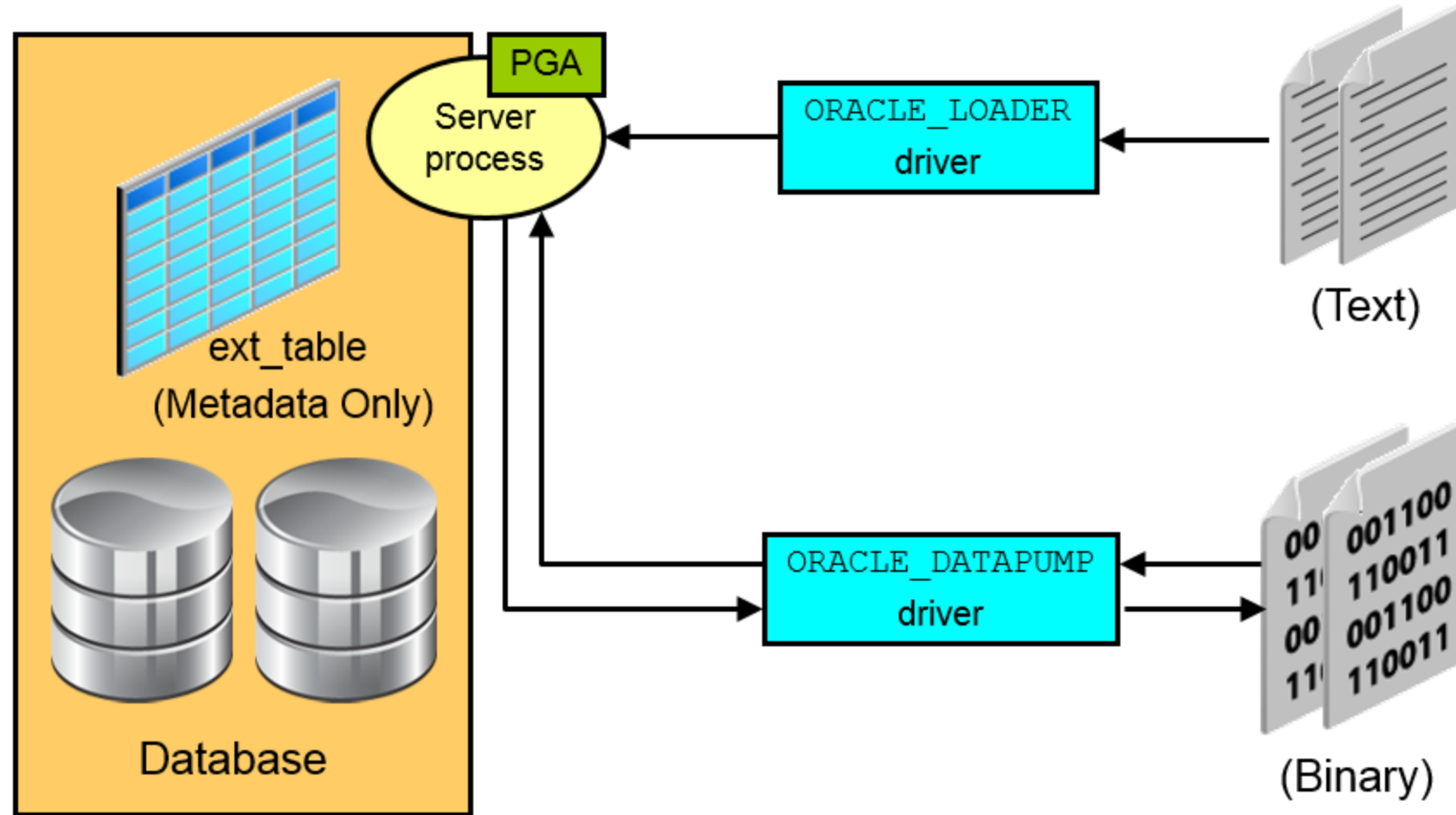


Express Mode

- Specify a table name to initiate an Express Mode load.
- Table columns must be scalar data types (character, number, or datetime).
- A data file can contain only delimited character data.
- SQL*Loader uses table column definitions to determine input data types.
- There is no need to create a control file.



External Tables



External Table Benefits

- Data can be used directly from the external file or loaded into another database.
- External data can be queried and joined directly in parallel with tables residing in the database, without requiring it to be loaded first.
- The results of a complex query can be unloaded to an external file.
- You can combine generated files from different sources for loading purposes.

Migrating to Oracle Database Cloud Service: Considerations

- Some of the characteristics and factors to consider when choosing a migration method are:
 - On-premises database version
 - Oracle Database Cloud database version
 - On-premises host operating system and version
 - On-premises database character set
 - Quantity of data, including indexes
 - Data types used in the on-premises database
 - Storage for data staging
 - Acceptable length of system outage
 - Network bandwidth



Migrating to Oracle Database Cloud Service: Information Gathering

- To determine which migration methods are applicable to your migration scenario, gather the following information:
 - Database version of your on-premises database
 - For on-premises Oracle Database 12c databases, the architecture of the database (multitenant or non-CDB)
 - Endian format (byte ordering) of your on-premises database's host platform
 - Database character set of your on-premises database and your Database Cloud Service database
 - Database version of your Database Cloud Service database



See [Choosing a Migration Method](#) in *Using Oracle Database Cloud Service* for additional information.

Applicable Migration Methods



Method	On-premises 11g database to Cloud 11g database	On-premises 11g database to Cloud 12c PDB	On-premises 12c non-CDB to Cloud 12c PDB	On-premises 12c PDB to Cloud 12c PDB
Data Pump Conventional Export/Import	Y	Y	Y	Y
Data Pump Transportable Tablespace	Y	Y	Y	Y
Data Pump Full Transportable	N	Y	Y	Y
RMAN Transportable Tablespace with Data Pump	Y	Y	Y	Y
RMAN CONVERT Transportable Tablespace with Data Pump	Y	Y	Y	Y
RMAN Cross-Platform Transportable Tablespace Backup Sets	N	N	Y	Y
RMAN Cross-Platform Transportable PDB	N	N	N	Y

Applicable Migration Methods



Method	On-premises 11g database to Cloud 11g database	On-premises 11g database to Cloud 12c PDB	On-premises 12c non-CDB to Cloud 12c PDB	On-premises 12c PDB to Cloud 12c PDB
Unplugging/Plugging	N	N	Y	Y
Remote Cloning	N	N	Y	Y
SQL Developer and SQL*Loader to Migrate Selected Objects	N	N	Y	Y
SQL Developer and <code>INSERT</code> Statements to Migrate Selected Objects	N	N	Y	Y

Summary

- In this lesson, you should have learned how to:
 - Describe ways to move data
 - Explain the general architecture of Oracle Data Pump
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 - Use SQL*Loader to load data from a non-Oracle database (or user files)
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Practice 15: Overview

- 15-1: Moving Data from One PDB to Another
- 15-2: Loading Data into a PDB from an External File