Oracle连接器如何支持update和delete语句操作

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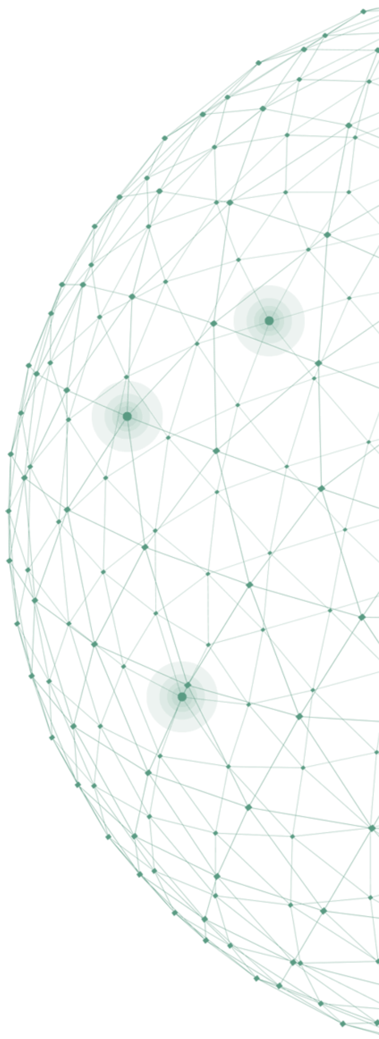


update和delete语句支持的基本原理

- 更新和删除都是基于RowID的记录级操作；

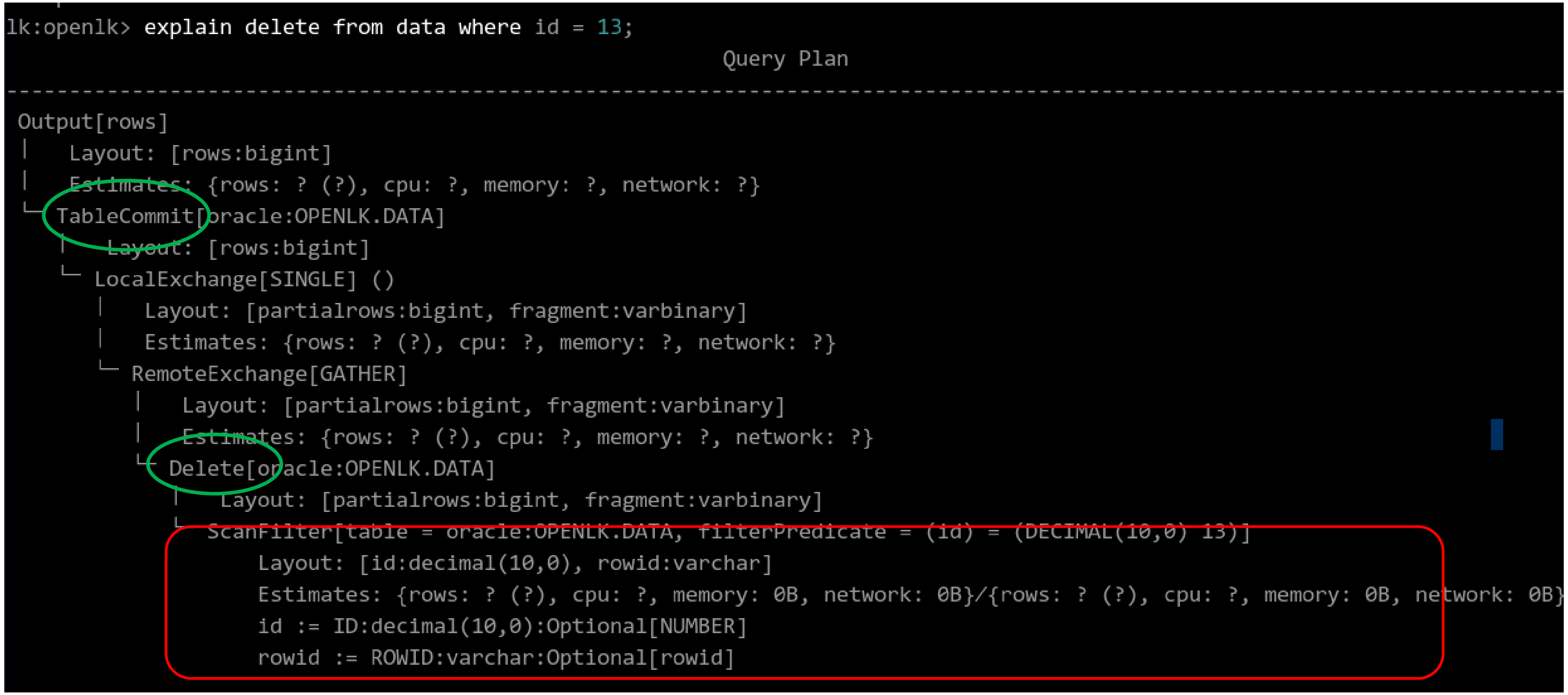
- 语句的数据处理大致分二个阶段：
  - 通过查询(含where条件的过滤)获取到RowID及相关数据(update涉及)
  - 在查询结果的基础上进行delete和update操作

- 数据源RowID的支持：能够唯一确定一行的列，可以是物理的也可以是逻辑的。

  如oracle对每张表有一个ROWID的隐藏列，这个列的值为64位的字符串，其值可以唯一确定一行。

- 对一些可以进一步优化的数据源，支持下推操作；

update和delete语句支持的基本原理---delete操作



```
lk:openlk> explain delete from data where id = 13;
                                              Query Plan
---------------------------------------------------------------------------------------------------------
 Output[rows]
 │   Layout: [rows:bigint]
 │   Estimates: {rows: ? (?), cpu: ?, memory: ?, network: ?}
 └─ TableCommit[oracle:OPENLK.DATA]
    │   Layout: [rows:bigint]
    └─ LocalExchange[SINGLE] ()
       │   Layout: [partialrows:bigint, fragment:varbinary]
       │   Estimates: {rows: ? (?), cpu: ?, memory: ?, network: ?}
       └─ RemoteExchange[GATHER]
          │   Layout: [partialrows:bigint, fragment:varbinary]
          │   Estimates: {rows: ? (?), cpu: ?, memory: ?, network: ?}
          └─ Delete[oracle:OPENLK.DATA]
             │   Layout: [partialrows:bigint, fragment:varbinary]
             └─ ScanFilter[table = oracle:OPENLK.DATA, filterPredicate = (id) = (DECIMAL(10,0) 13)]
                    Layout: [id:decimal(10,0), rowid:varchar]
                    Estimates: {rows: ? (?), cpu: ?, memory: 0B, network: 0B}/{rows: ? (?), cpu: ?, memory: 0B, network: 0B}
                    id := ID:decimal(10,0):Optional[NUMBER]
                    rowid := ROWID:varchar:Optional[rowid]
```

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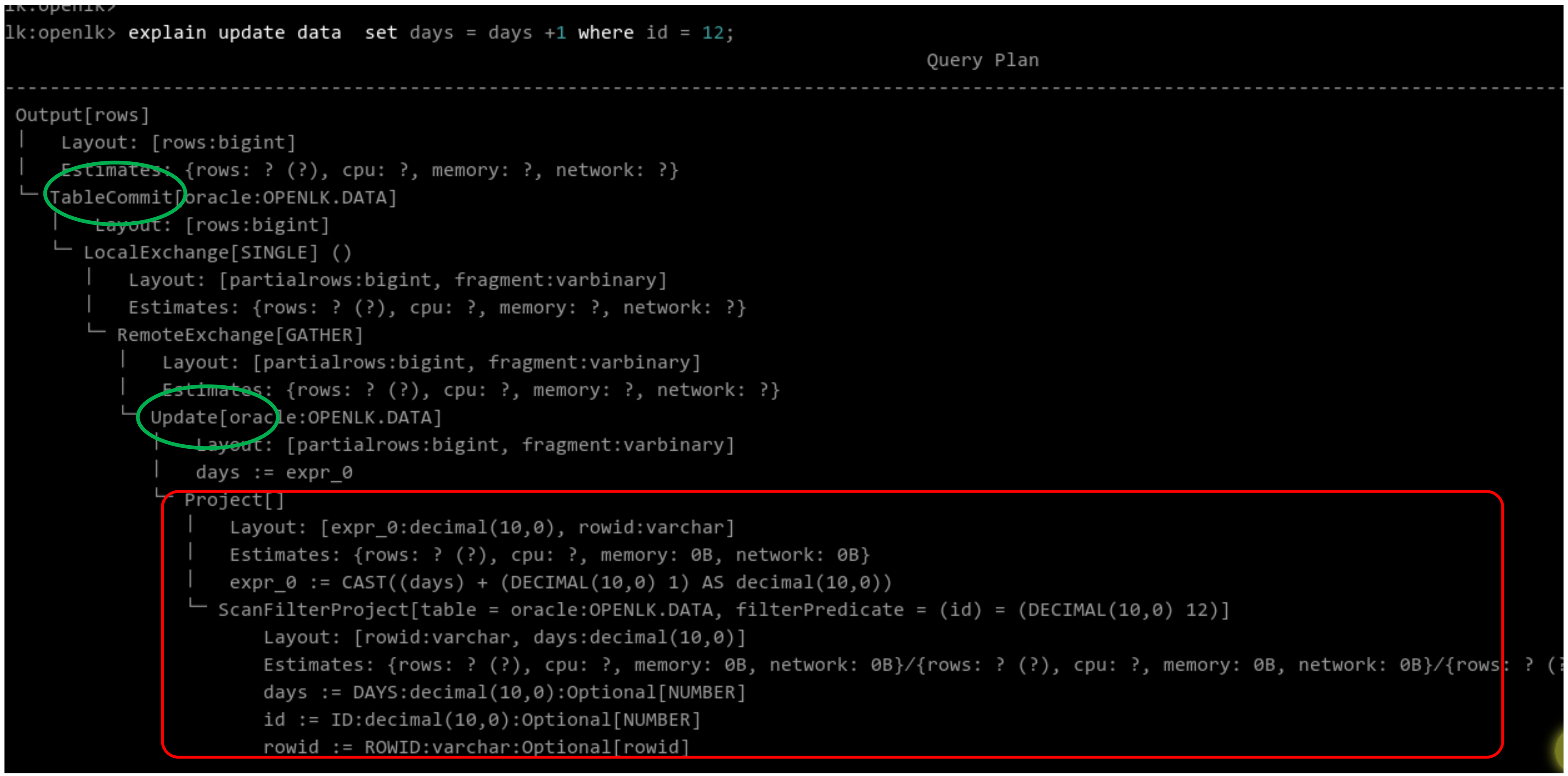
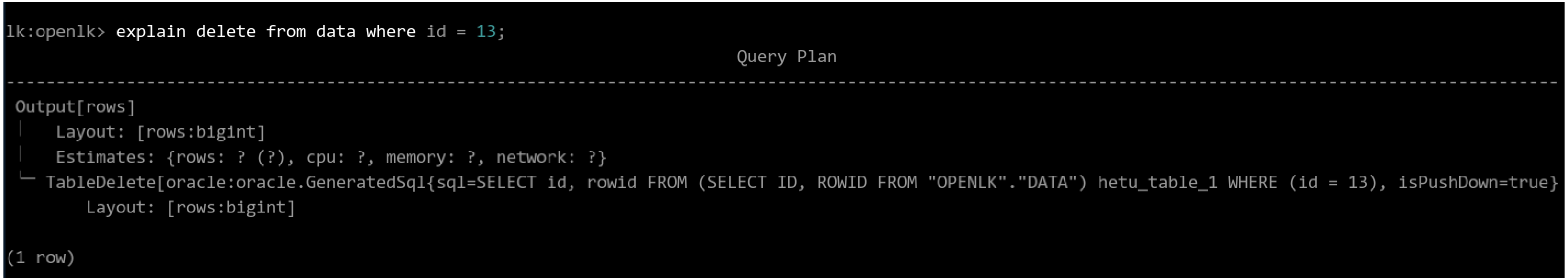
update和delete语句支持的基本原理---update操作



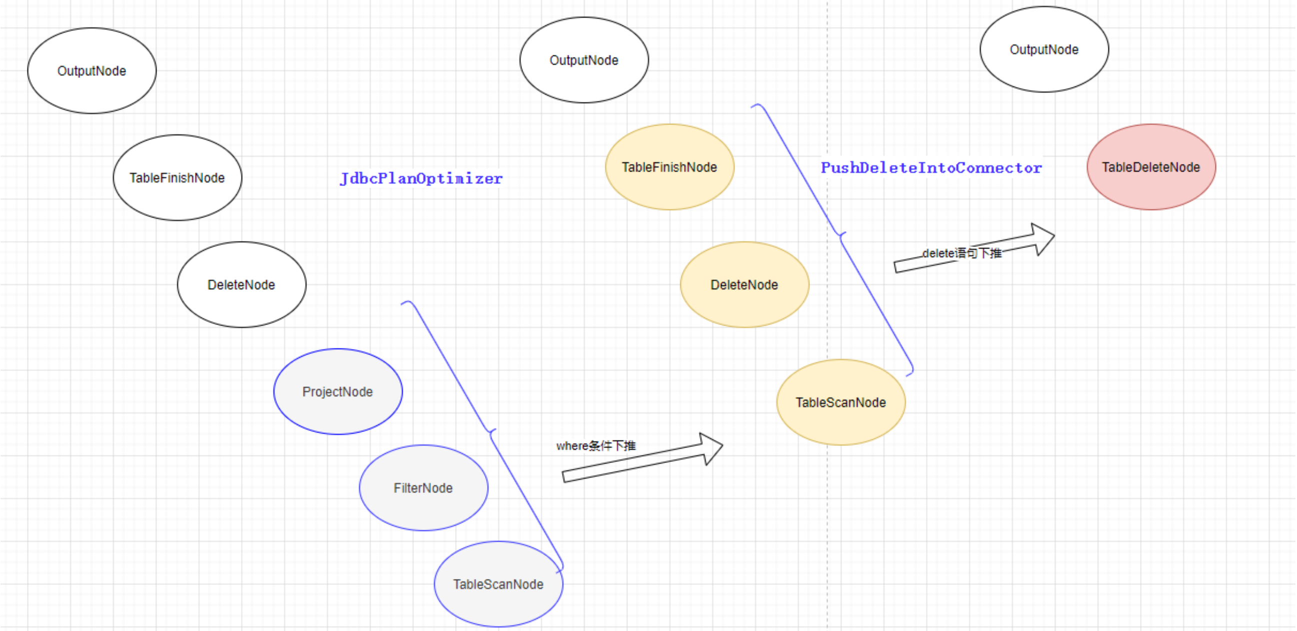
```
lk:openlk>
lk:openlk> explain update data  set days = days +1 where id = 12;
                                                                                         Query Plan
-----------------------------------------------------------------------------------------------------------------------------------------------------------
 Output[rows]
 │   Layout: [rows:bigint]
 │   Estimates: {rows: ? (?), cpu: ?, memory: ?, network: ?}
 └─ TableCommit[oracle:OPENLK.DATA]
    │   Layout: [rows:bigint]
    └─ LocalExchange[SINGLE] ()
       │   Layout: [partialrows:bigint, fragment:varbinary]
       │   Estimates: {rows: ? (?), cpu: ?, memory: ?, network: ?}
       └─ RemoteExchange[GATHER]
          │   Layout: [partialrows:bigint, fragment:varbinary]
          │   Estimates: {rows: ? (?), cpu: ?, memory: ?, network: ?}
          └─ Update[oracle:OPENLK.DATA]
             │   Layout: [partialrows:bigint, fragment:varbinary]
             │   days := expr_0
             └─ Project[]
                │   Layout: [expr_0:decimal(10,0), rowid:varchar]
                │   Estimates: {rows: ? (?), cpu: ?, memory: 0B, network: 0B}
                │   expr_0 := CAST((days) + (DECIMAL(10,0) 1) AS decimal(10,0))
                └─ ScanFilterProject[table = oracle:OPENLK.DATA, filterPredicate = (id) = (DECIMAL(10,0) 12)]
                       Layout: [rowid:varchar, days:decimal(10,0)]
                       Estimates: {rows: ? (?), cpu: ?, memory: 0B, network: 0B}/{rows: ? (?), cpu: ?, memory: 0B, network: 0B}/{rows: ? (
                       days := DAYS:decimal(10,0):Optional[NUMBER]
                       id := ID:decimal(10,0):Optional[NUMBER]
                       rowid := ROWID:varchar:Optional[rowid]
```

update和delete语句支持的基本原理---delete下推



```
lk:openlk> explain delete from data where id = 13;
                                                                                                    Query Plan
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
 Output[rows]
 │   Layout: [rows:bigint]
 │   Estimates: {rows: ? (?), cpu: ?, memory: ?, network: ?}
 └─ TableDelete[oracle:oracle.GeneratedSql{sql=SELECT id, rowid FROM (SELECT ID, ROWID FROM "OPENLK"."DATA") hetu_table_1 WHERE (id = 13), isPushDown=true}
        Layout: [rows:bigint]

(1 row)
```



二层下推处理：

1）满足删除条件的扫描对应的查询下推；

2）查询可以全部下推后，进行delete的下推；

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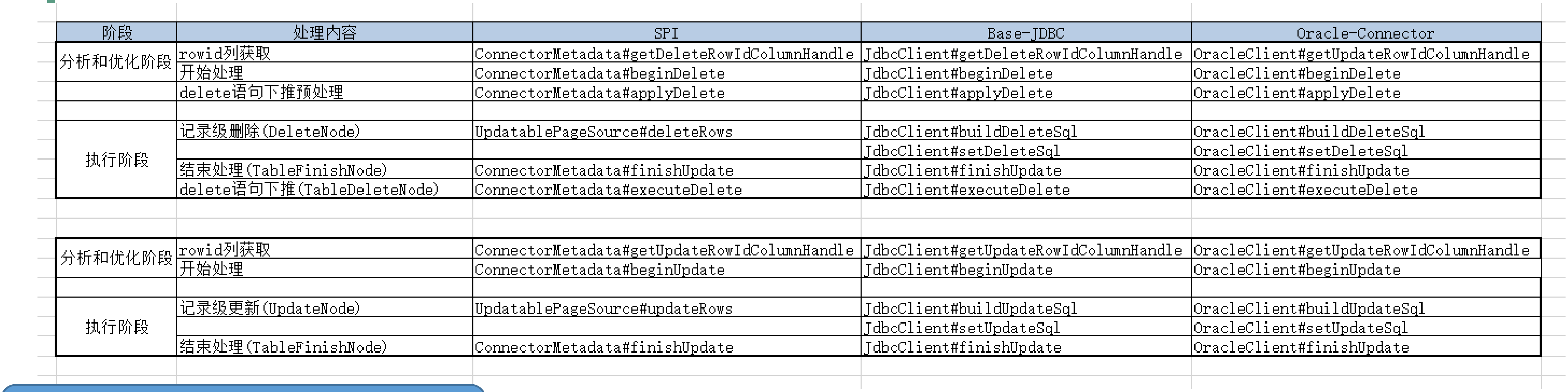
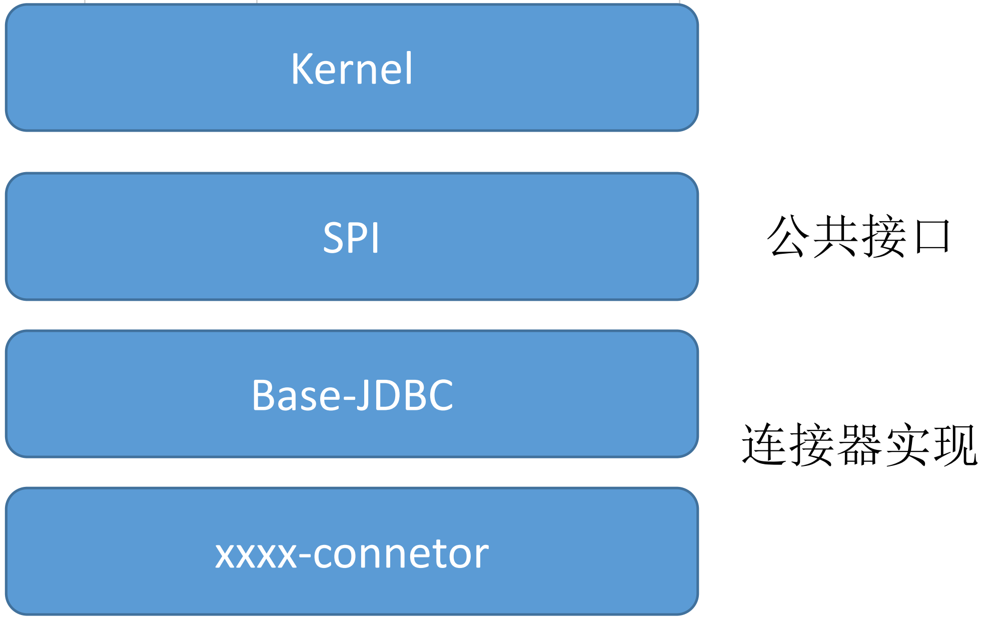
update和delete语句支持的适配开发



阶段	处理内容	SPI	Base-JDBC	Oracle-Connector
分析和优化阶段	rowid列获取	ConnectorMetadata#getDeleteRowIdColumnHandle	JdbcClient#getDeleteRowIdColumnHandle	OracleClient#getUpdateRowIdColumnHandle
	开始处理	ConnectorMetadata#beginDelete	JdbcClient#beginDelete	OracleClient#beginDelete
	delete语句下推预处理	ConnectorMetadata#applyDelete	JdbcClient#applyDelete	OracleClient#applyDelete
执行阶段	记录级删除(DeleteNode)	UpdatablePageSource#deleteRows	JdbcClient#buildDeleteSql	OracleClient#buildDeleteSql
			JdbcClient#setDeleteSql	OracleClient#setDeleteSql
	结束处理(TableFinishNode)	ConnectorMetadata#finishUpdate	JdbcClient#finishUpdate	OracleClient#finishUpdate
	delete语句下推(TableDeleteNode)	ConnectorMetadata#executeDelete	JdbcClient#executeDelete	OracleClient#executeDelete
分析和优化阶段	rowid列获取	ConnectorMetadata#getUpdateRowIdColumnHandle	JdbcClient#getUpdateRowIdColumnHandle	OracleClient#getUpdateRowIdColumnHandle
	开始处理	ConnectorMetadata#beginUpdate	JdbcClient#beginUpdate	OracleClient#beginUpdate
执行阶段	记录级更新(UpdateNode)	UpdatablePageSource#updateRows	JdbcClient#buildUpdateSql	OracleClient#buildUpdateSql
			JdbcClient#setUpdateSql	OracleClient#setUpdateSql
	结束处理(TableFinishNode)	ConnectorMetadata#finishUpdate	JdbcClient#finishUpdate	OracleClient#finishUpdate



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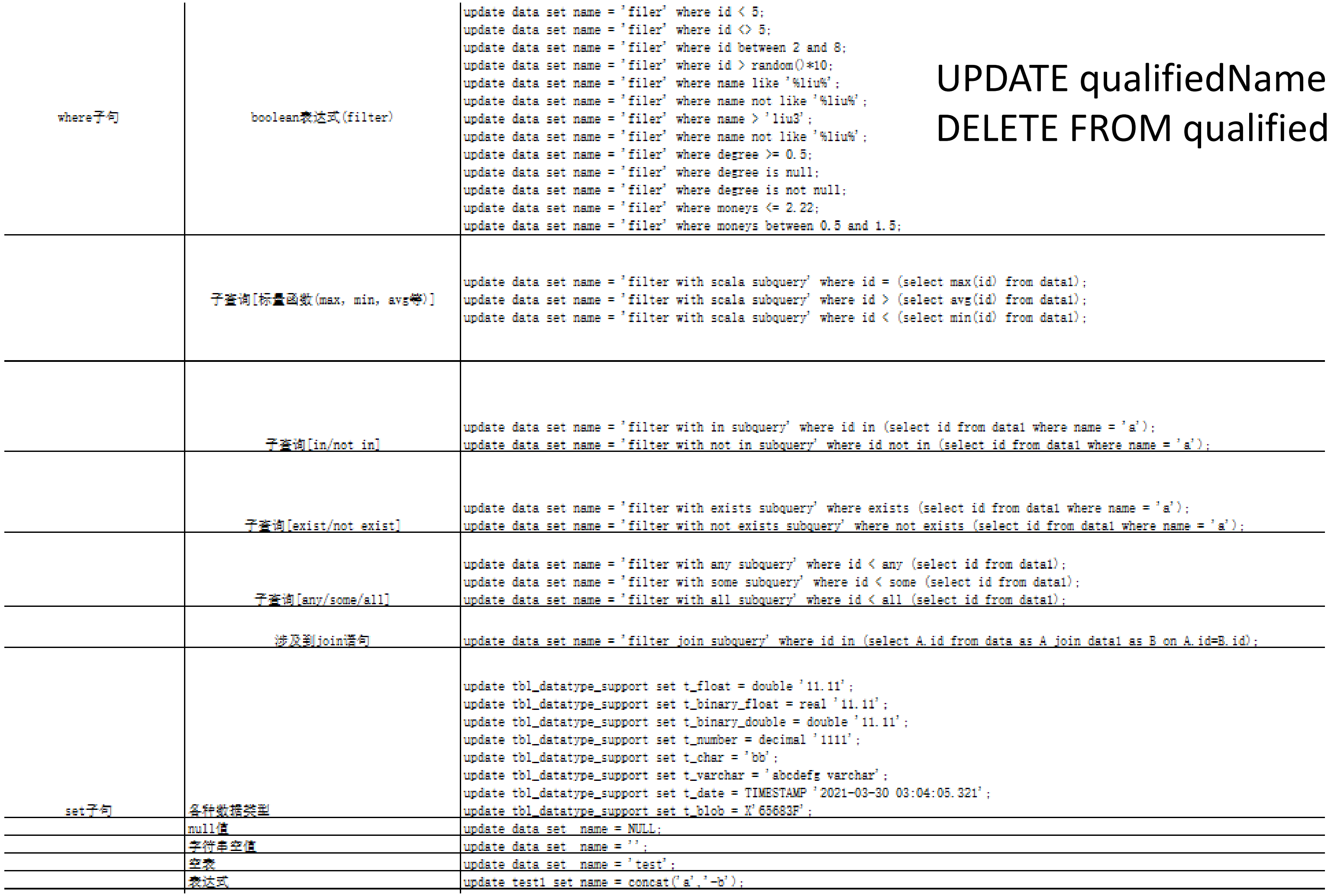
oracle update和delete支持情况



where子句	boolean表达式(filter)	update data set name = 'filer' where id < 5; update data set name = 'filer' where id <> 5; update data set name = 'filer' where id between 2 and 8; update data set name = 'filer' where id > random()*10; update data set name = 'filer' where name like '%liu%'; update data set name = 'filer' where name not like '%liu%'; update data set name = 'filer' where name > 'liu3'; update data set name = 'filer' where name not like '%liu%'; update data set name = 'filer' where degree >= 0.5; update data set name = 'filer' where degree is null; update data set name = 'filer' where degree is not null; update data set name = 'filer' where moneys <= 2.22; update data set name = 'filer' where moneys between 0.5 and 1.5;
	子查询[标量函数(max, min, avg等)]	update data set name = 'filter with scala subquery' where id = (select max(id) from data1); update data set name = 'filter with scala subquery' where id > (select avg(id) from data1); update data set name = 'filter with scala subquery' where id < (select min(id) from data1);
	子查询[in/not in]	update data set name = 'filter with in subquery' where id in (select id from data1 where name = 'a'); update data set name = 'filter with not in subquery' where id not in (select id from data1 where name = 'a');
	子查询[exist/not exist]	update data set name = 'filter with exists subquery' where exists (select id from data1 where name = 'a'); update data set name = 'filter with not exists subquery' where not exists (select id from data1 where name = 'a');
	子查询[any/some/all]	update data set name = 'filter with any subquery' where id < any (select id from data1); update data set name = 'filter with some subquery' where id < some (select id from data1); update data set name = 'filter with all subquery' where id < all (select id from data1);
	涉及到join语句	update data set name = 'filter join subquery' where id in (select A.id from data as A join data1 as B on A.id=B.id);

set子句	各种数据类型	update tbl_datatype_support set t_float = double '11.11';
		update tbl_datatype_support set t_binary_float = real '11.11';
		update tbl_datatype_support set t_binary_double = double '11.11';
		update tbl_datatype_support set t_number = decimal '1111';
		update tbl_datatype_support set t_char = 'bb';
		update tbl_datatype_support set t_varchar = 'abcdefg varchar';
		update tbl_datatype_support set t_date = TIMESTAMP '2021-03-30 03:04:05.321';
		update tbl_datatype_support set t_blob = X'65683F';

	null值	update data set name = NULL;
	字符串空值	update data set name = '';
	空表	update data set name = 'test';
	表达式	update test1 set name = concat('a','-b');

语法：

UPDATE qualifiedName SET assignmentList (WHERE booleanExpression)

DELETE FROM qualifiedName (WHERE booleanExpression)

子查询目前只支持非关联子查询

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Q&A

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Thank you!

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