What's New in Apache Iceberg?
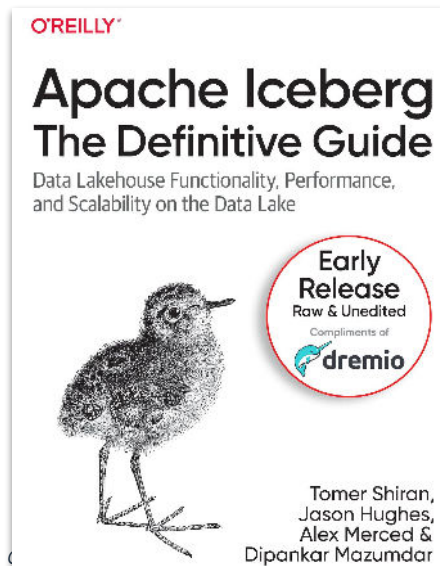
Gnarly Data Waves • June 6th 2023

About Me

- **Current:** Developer Advocate @Dremio

- **Open source:** Apache Iceberg, Arrow, Project Nessie

- **Past:** BI, Machine Learning, Data architecture

O'REILLY®

Apache Iceberg
The Definitive Guide

Data Lakehouse Functionality, Performance, and Scalability on the Data Lake

Early Release
Raw & Unedited
Compliments of
dremio

Tomer Shiran,
Jason Hughes,
Alex Merced &
Dipankar Mazumdar

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Agenda

1 Apache Iceberg Community

2 Apache Iceberg 1.2.0 Release

3 New Capabilities

4 PyIceberg: Pythonic API

5 Compute Engine Updates

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Apache Iceberg Community

"A developer community is not just about code; it's diversity & about creating a space where ideas flourish, and individuals inspire each other"
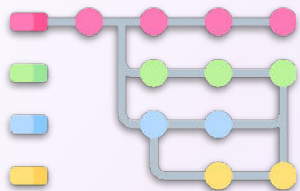
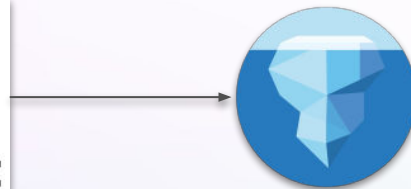Apache Iceberg Workspace, Developer Mailing Lists

@IcebergDevs

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Some Metrics

Stars History — apache/iceberg

Pull Request History
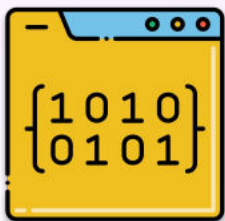

Pull Requests Creators' Companies

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Apache Iceberg 1.2.0: Core Library

Branching, Tagging

Delta to Iceberg migration
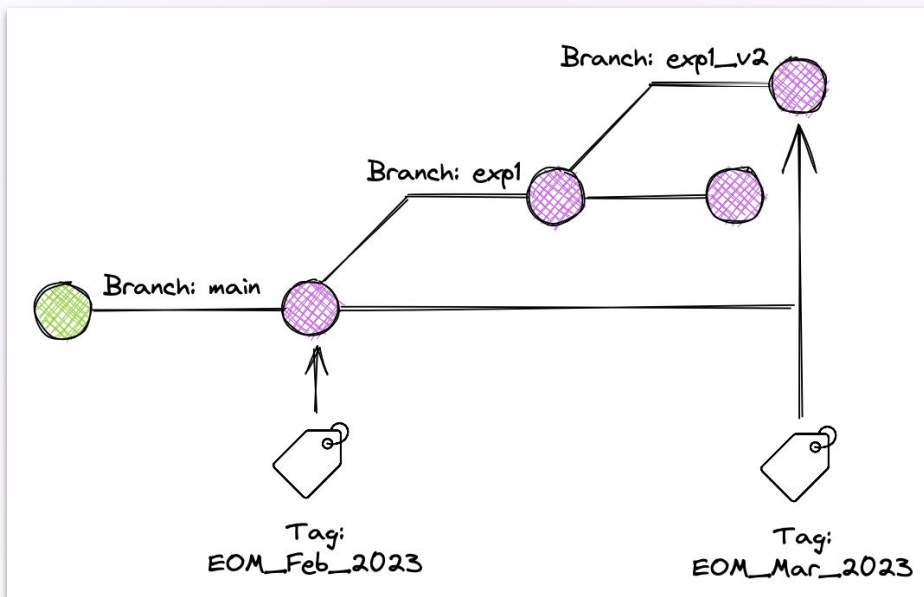
Human–readable metrics

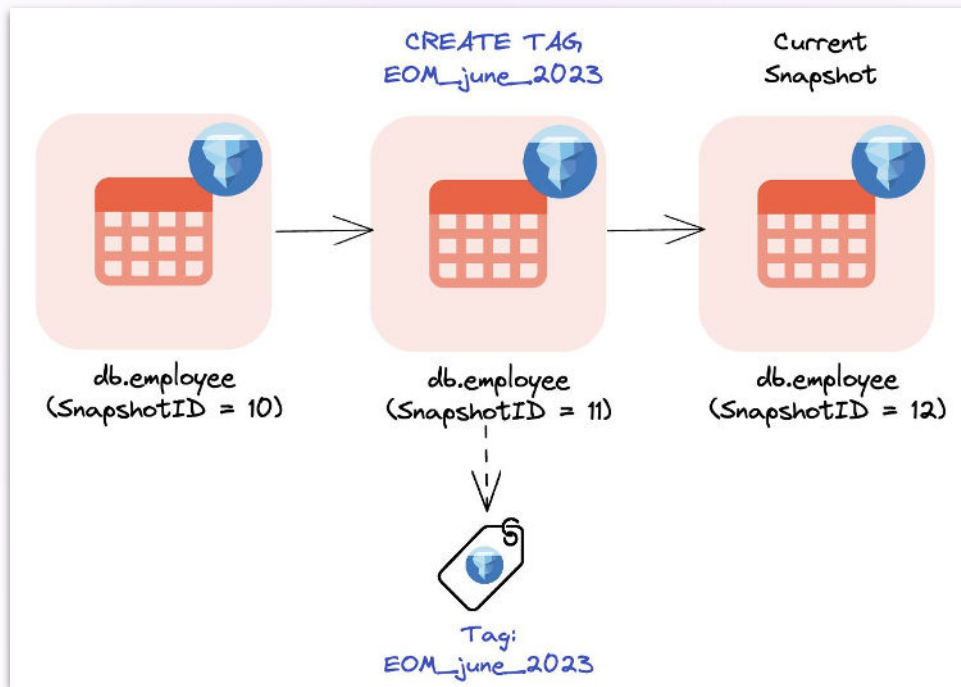Stats File reusability

FileIO support for ORC readers & writers

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Branching & Tagging

- Git-like Branch & Tags

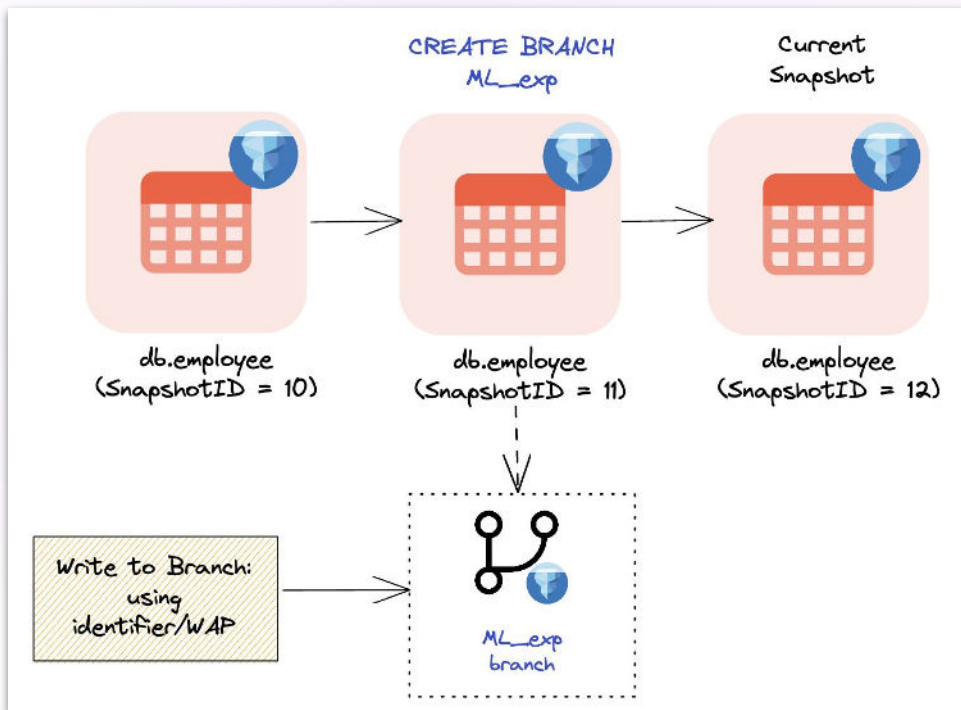- Keep track of the state[version] of Iceberg tables

- Core: Snapshot

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Iceberg Tags

- Immutable labels for individual snapshots

- RETAIN tags

- Data/ML reproducibility, Version-specific analysis
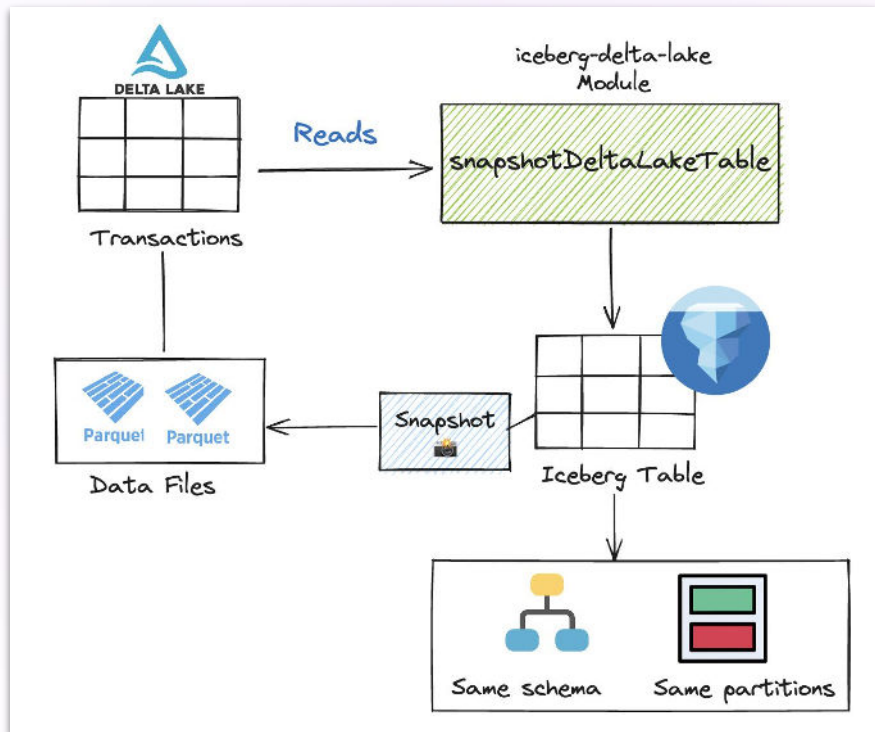
```
ALTER TABLE glue.test.employee
CREATE TAG EOM_June_2023
```

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Iceberg Branches

- Mutable labels for snapshots

- Adheres to Iceberg's commit conflict resolution & retry policy

- Write to a Branch using identifier or WAP

- Write-Audit-Publish, Isolated data experiments

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Delta to Iceberg migration

- Reads Delta Lake table transactions -> Converts to Iceberg

- Schema & Partitioning scheme maintained

- Existing data files added to Iceberg table's metadata

- Snapshot uses original table's data files

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Human-readable metrics

BEFORE

AFTER

```
"lower_bound": {
            "bytes": "¹Ô\\u0006\\u0000"
        },

"upper_bound": {
            "bytes": "¹Ô\\u0006\\u0000"
        }
```
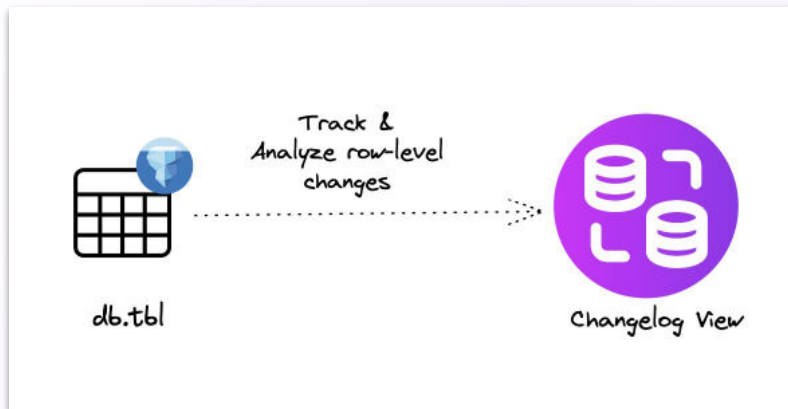
Files Metadata
Table

```
SELECT readable_metrics.id.lower_bound,
readable_metrics.id.upper_bound FROM
test.employee.files"
```

readable_metrics.id.lower_bound	readable_metrics.id.upper_bound
0	6	6
1	7	7
2	8	8
3	4	4
4	3	3
5	2	2
6	1	1

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Change Data Capture

db.tbl → Track & Analyze row-level changes → Changelog View

Spark Procedure

```
CALL spark_catalog.system.create_changelog_view(
  table => 'db.tbl',
  options => map('start-snapshot-id','1','end-snapshot-id', '2')
)
```

```
SELECT * FROM glue.db.tbl.changes
```

id	name	_change_type	_change_ordinal	_change_snapshot_id
1	Alice	INSERT	0	5390529835796506035
2	Bob	INSERT	0	5390529835796506035
1	Alice	DELETE	1	8764748981452218370

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Catalog Migrator Tool

iceberg-catalog-migrator
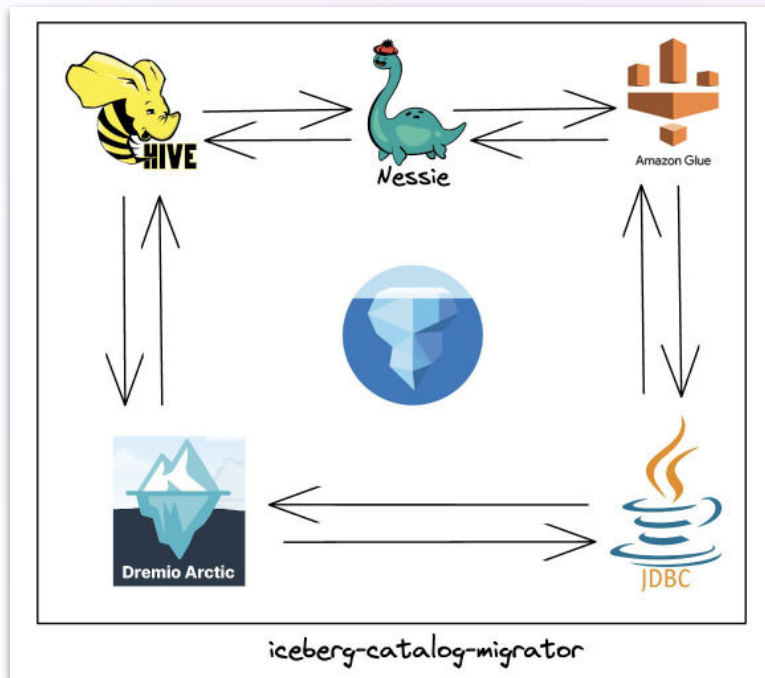
- Bulk migrate from one catalog to another without data copies

- Commands: register & migrate

- CLI tool: https://github.com/projectnessie/iceberg-catalog-migrator

```
java -jar iceberg-catalog-migrator-cli-0.2.0.jar migrate \
--source-catalog-type GLUE \
--source-catalog-properties warehouse=s3a://bucket/gluecatalog/,io-impl=org.apache.iceberg.aws.s3.S3FileIO \
--target-catalog-type NESSIE \
--target-catalog-properties uri=http://localhost:19120/api/v1,ref=main,warehouse=s3a://bucket/nessie/,io-impl=org.apache.iceberg.aws.s3.S3FileIO \
--identifiers db1.nominees
```
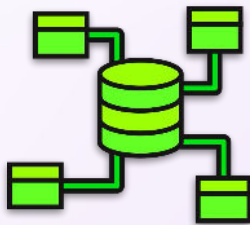
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Catalog Migrator Tool
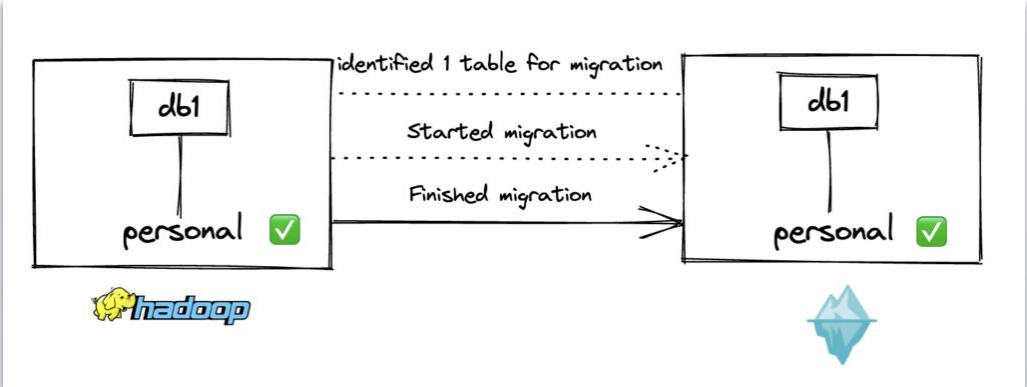
Scenario 1

Scenario 2

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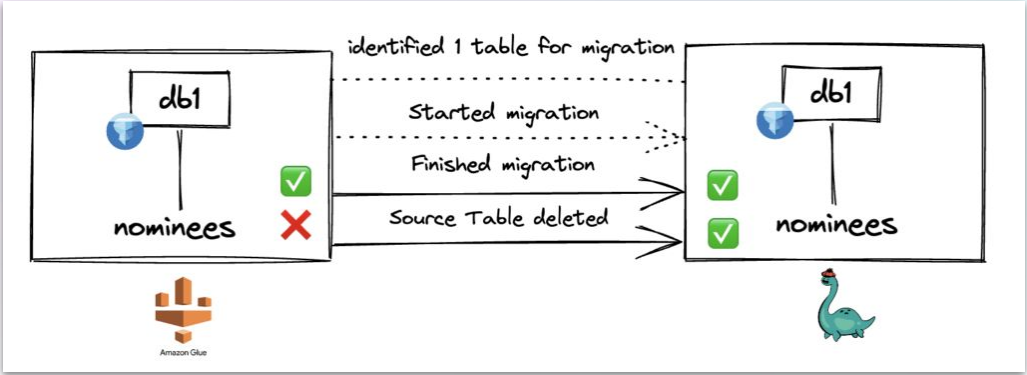
Spark: Performance Updates

Storage Partitioned Joins
PR

Arrow Environment Settings
PR

Aggregate Pushdown Support
PR

Default Write
Distribution mode
PR

Metadata–only DELETE
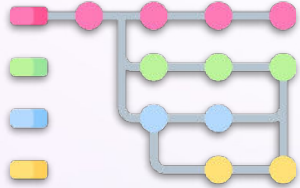PR

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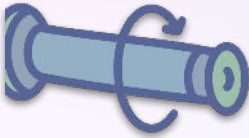# Flink Updates

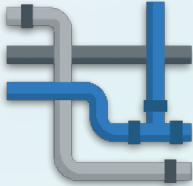Metadata Tables
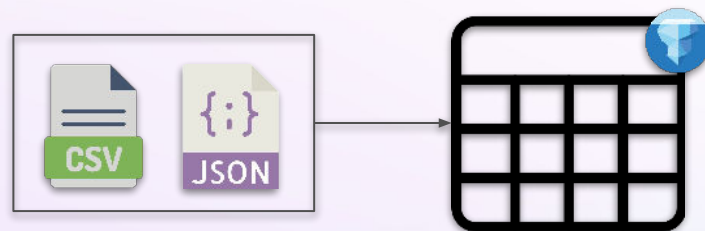PR

Branching & Tagging
PR

Throttling Support for Streaming
Reads
PR

Enable Multiple Flink
Sinks
PR

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Dremio Sonar Updates

COPY INTO

```
1  COPY INTO context.MyTable
2    FROM '@SOURCE/bucket/path/folder/'
3    FILE_FORMAT 'json'
4
```

```
1  COPY INTO context.myTable |
2    FROM '@SOURCE/bucket/path/folder'
3    REGEX '.*.csv'
4
```

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Dremio Sonar Updates

Rollback Iceberg Tables

```
1  ROLLBACK TABLE demo.example_table TO SNAPSHOT '2489484212521283189'
2
3
4
5
```

```
1  ROLLBACK TABLE demo.example_table
2  TO TIMESTAMP '2022-06-22 17:06:00'
3
```

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Dremio Sonar Updates
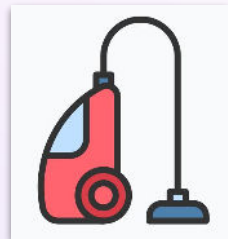

Optimize Iceberg Tables

```
1  OPTIMIZE TABLE demo.example_table
2      REWRITE DATA (TARGET_FILE_SIZE_MB=256)
3
```

```
1  OPTIMIZE TABLE demo.example_table
2      FOR PARTITIONS sales_year=2023
3
```

```
1  OPTIMIZE TABLE demo.example_table
2      REWRITE MANIFESTS
```

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Dremio Sonar

Expire Snapshots:
VACUUM

```
1  VACUUM TABLE 's3.SF_Incidents2016'
2      EXPIRE SNAPSHOTS older_than=TIMESTAMP '2023-04-20 00:00:00.000' retain_last=20;
3
```

Context:

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PyIceberg: Stats Filtering (available)

- Skip Full Data Files

- Helps with Pruning

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PyIceberg: Convert to Ray
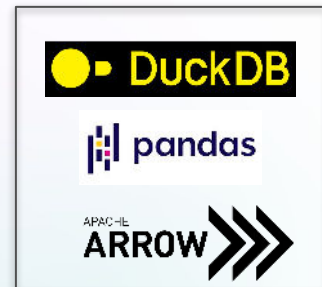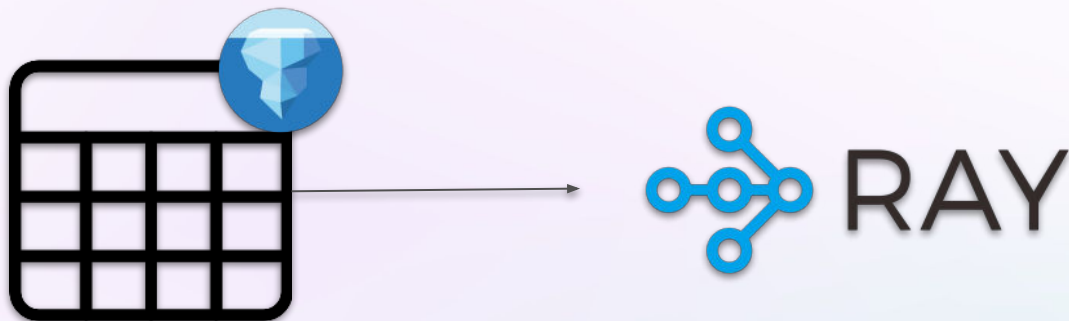

```
ray_dataset = table.scan().to_ray()
```

For Directly converting Iceberg datasets to
Ray: ML tasks

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PyIceberg: LIMIT

```python
from pyiceberg.catalog import load_catalog

table = catalog.load_table("nyc.taxis")
scan = table.scan(
    row_filter=GreaterThanOrEqual("trip_distance", 10.0),
    selected_fields=("VendorID", "tpep_pickup_datetime", "tpep_dropoff_datetime"),
    limit=100,
)
```

Limit preview of an Iceberg table

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Pylceberg: Positional Deletes

```
DELETE FROM iceberg_table WHERE id = '10'

select count(uid) from "iceberg_table"
where id = '10'
```

Fix for deleted records returned back in Pylceberg

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Pylceberg CLI: GCS Support

Support for GCS in Pylceberg CLI

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Pylceberg: What can be done?

Smooth & Mature integration with other tools

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Apache Iceberg 1.3.0

Add support for Spark 3.4 #7174

Closed aokolnychyi opened this issue on Mar 22 · 3 comments · Fixed by #7378

Spark 3.4: Add RewritePositionDeleteFilesProcedure #7572

Merged aokolnychyi merged 3 commits into `apache:master` from `szehon-ho:rewrite_deletes_procedures` 2 weeks ago

Improve distribution and ordering in Spark 3.4 #7633

Closed aokolnychyi opened this issue 2 weeks ago · 0 comments · Fixed by #7637

Spark 3.4: Avoid local sort for MERGE cardinality check #7558

Merged aokolnychyi merged 2 commits into `apache:master` from `aokolnychyi:avoid-sort-merge-cardinality-check` 2 weeks ago

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Thank you!

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