The Duck(DB) Feather in your Parquet Cap

a talk by

PREQUEL

Enterprise-ready Data Sharing

prequel.co
What is Enterprise Data Sharing?
Data delivery is a transportation planning problem
Every time we move a batch of data, we call that a “Transfer”

Each transfer has a manifest

Each manifest lists all the steps to execute the transfer

Our planner generates the most efficient manifest, constrained by data integrity

DuckDB is a core component of our planner
Type Integrity
Worse Case Data Movement
Parquet is the Gold Standard

Columnar Binary file format for relational data
Space efficient, fast for column operations, and fully structured.

Robust Type support
Universal primitive types that can be easily extended via logical typing standards

Many systems can read/write Parquet in Parallel
Most OLAP warehouses can load/unload Parquet files to object storage with higher throughput than via queries.
SITUATION: THERE ARE 14 COMPETING STANDARDS.

14?! RIDICULOUS! WE NEED TO DEVELOP ONE UNIVERSAL STANDARD THAT COVERS EVERYONE'S USE CASES. YEAH!

SOON:

SITUATION: THERE ARE 15 COMPETING STANDARDS.
Rule 927.b

“If a standard can vary, it will infinitely”
Our Planner has to account for type mismatches

Examples of type variation between Parquet writers

1. **Strings**: encodings
2. **Boolean**: typed boolean? Bit? uint?
3. **Decimals**: byte arrays or integers? What size integers?
4. **Timestamps**: Strings? Seconds since epoch? Milliseconds since epoch? time zones?
5. **Complex objects**: arrays? maps? structs?
## DuckDB to the Rescue

Enter ".help" for usage hints.
Connected to a transient in-memory database.
Use ".open FILENAME" to reopen on a persistent database.

```sql
SELECT * FROM parquet_metadata("~/Downloads/mock.parquet") LIMIT 10;
```

| file_name          | row_group_id | row_group_num_rows | row_group_num_columns | row_group_bytes | column_id | file_offset | num_values | path_in_schema | stats_min_value | stats_max_value | stats_null_count | stats_distinct_count | stats_min_value | stats_max_value | stats_null_count | stats_distinct_count | stats_min_value | stats_max_value | type | compression | encodings | index_page_offset | dictionary_page_offset | data_page_offset | total_compressed_size | total_uncompressed_size |
|--------------------|--------------|--------------------|-----------------------|------------------|------------|-------------|-------------|-------------|------------------|------------------|------------------|-------------------|----------------------|------------------|------------------|------------------|----------------------|-----------------|------------------|-------|-------------|-------------|-------------------|------------------------|------------------|---------------------|---------------------|
| /Users/nlp/Downloads/mock.parquet | 0             | 1000               | 11                    | 0                | 0          | 0           | 0           | 0           | 0                | 0                | 0                | 32800             | 1                 | 0                | 1000             | test_smallint        | 999                |
| /Users/nlp/Downloads/mock.parquet | 0             | 1000               | 11                    | 0                | 0          | 0           | 0           | 0           | 0                | 0                | 0                | 32804             | 2                 | 0                | 1000             | test_integer        | 999                |
| /Users/nlp/Downloads/mock.parquet | 0             | 1000               | 11                    | 0                | 0          | 0           | 0           | 0           | 0                | 0                | 0                | 4030              | 3                 | 0                | 1000             | test_bigint         | 999                |
| /Users/nlp/Downloads/mock.parquet | 0             | 1000               | 11                    | 0                | 0          | 0           | 0           | 0           | 0                | 0                | 0                | 4030              | 0                 | 0                | 1000             | test_real           | 320.4968           |
| ... |
```
Demo

Clickhouse: [Parquet Documentation](#)

DuckDB: [Environment](#)

Gist: [Some Example Queries](#)
Parquet.
Not only metadata scanning, but also normalization.

SQL.
SQL is our preferred interface for data manipulation

Embedded.
Allows our planner to be a library, not a service
Questions