CLICKHOUSE + APACHE ICEBERG:

READ & WRITE LAKEHOUSE TABLES

Unlocking the Future of Unified Data Analytics

28th Aug'25 | 8:30 PM IST

Presented by: OLake

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Nutanix

About Us

SHIVJI KUMAR JHA

Staff Engineer,
Data platform,
Nutanix

- **Areas of Interest**
  - Distributed Storage
  - Database & Streaming Internals
  - Application Architectures
- **Contributed to Clickhouse, MySQL, Apache Pulsar**
- **30+ talks at conferences & 10+ meetups**
  - Slides: https://github.com/shiv4289/shiv-tech-talks#talks
  - Recordings: https://tinyurl.com/shiv-talks
- **Text here:** linkedin.com/in/shivjijha/

SAURABH KUMAR OJHA

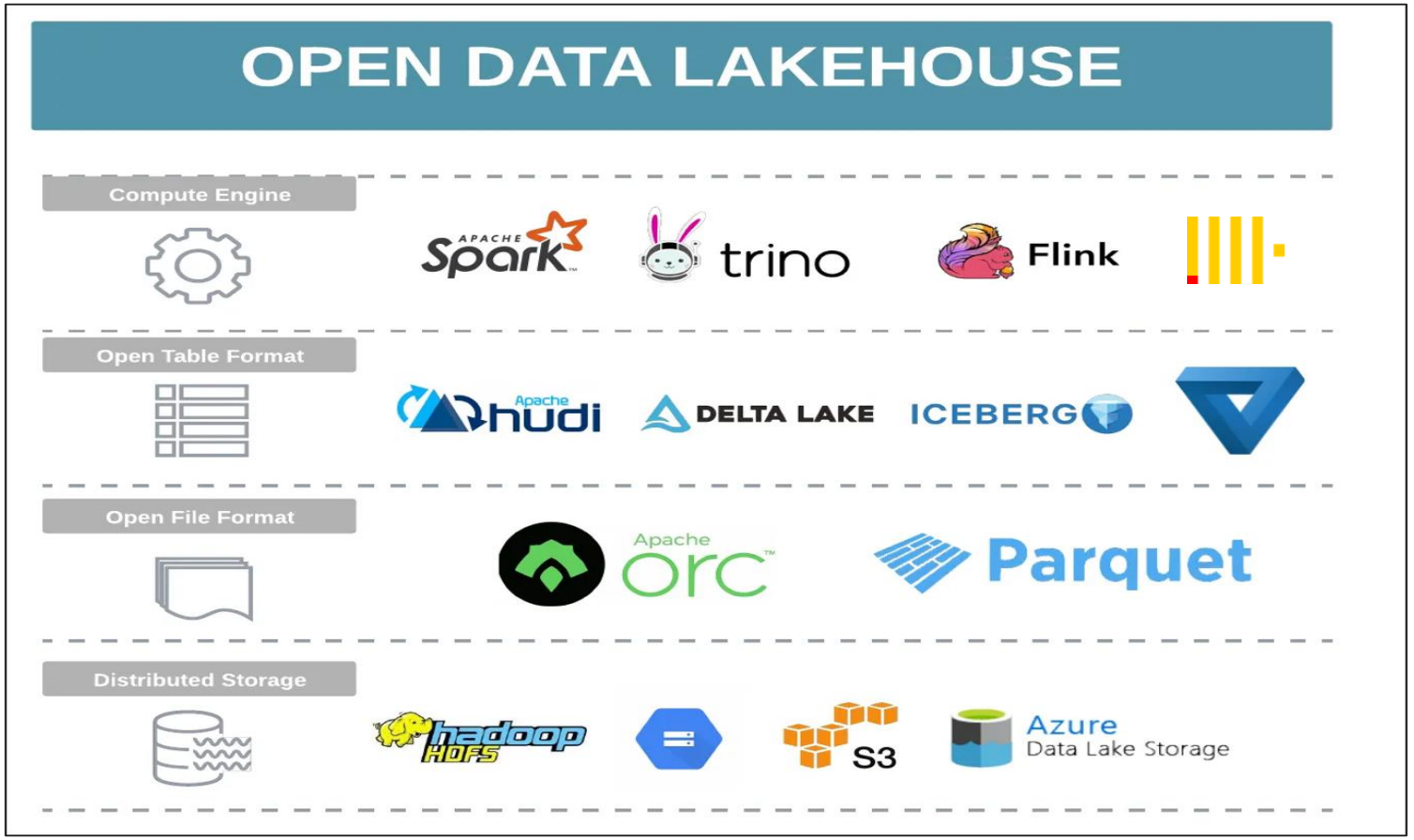
Software Engineer,
Data platform,
Nutanix

- **Areas of Interest**
  - Databases Internals
  - Streaming Internals
  - Linux kernel Features
- **Open-Source Enthusiast:** Contributions to Clickhouse server and Ecosystem, Nats, Transferia and more
- **Mostly active here:**
  - linkedin.com/in/ojhasaurabh2099/

Agenda

- Setting stage : Definitions
- Let's play with a Demo!
- Architecture Patterns & Use cases
- Lay of the land today: Clickhouse & Iceberg
- Call for contributors
- Wishlist for Future

The Lakehouse stack



https://alirezasadeghi1.medium.com/the-history-and-evolution-of-open-table-formats-0f1b9ea10e1e

What is Apache Iceberg?

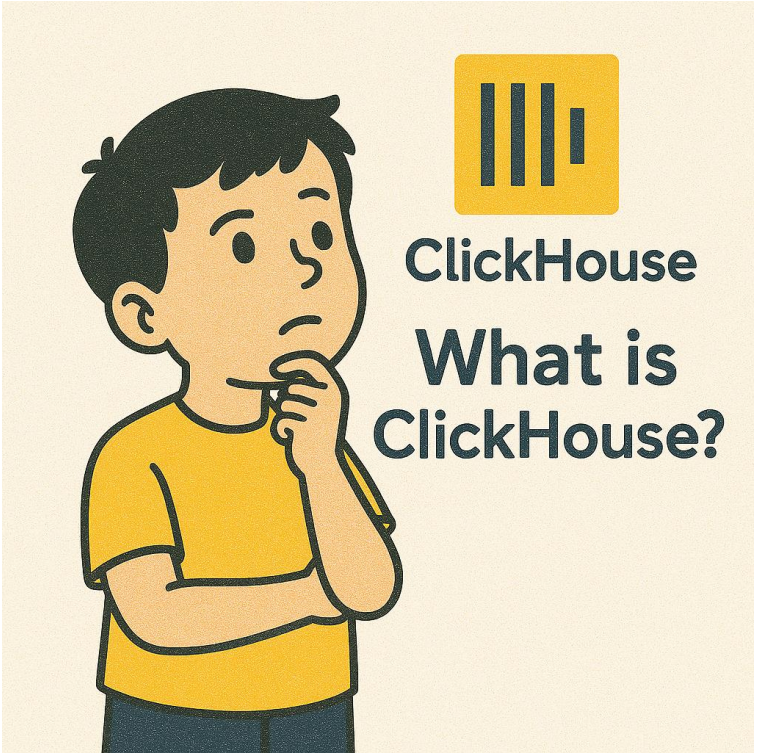
- Open Spec for table format, not a database engine
- SDKs with reference implementation, not for production
- Use Spark, Trino, DuckDB, Clickhouse, AWS S3 Tables etc..
- Supports
  - ACID transactions.
  - Time travel on data
  - Schema Evolution
  - Partition Evolution

Why Iceberg?

- Interoperability across engines (Spark, Flink, Trino, Clickhouse)
- Strong ecosystem: adoption & community
- Own your data, not locked in proprietary format
- Decoupling of **storage** and **compute**
- Even stream-native platforms like Kafka (TableFlow), Pulsar(Ursa), and RisingWave are adopting Iceberg
- A lot of mindshare at the moment!

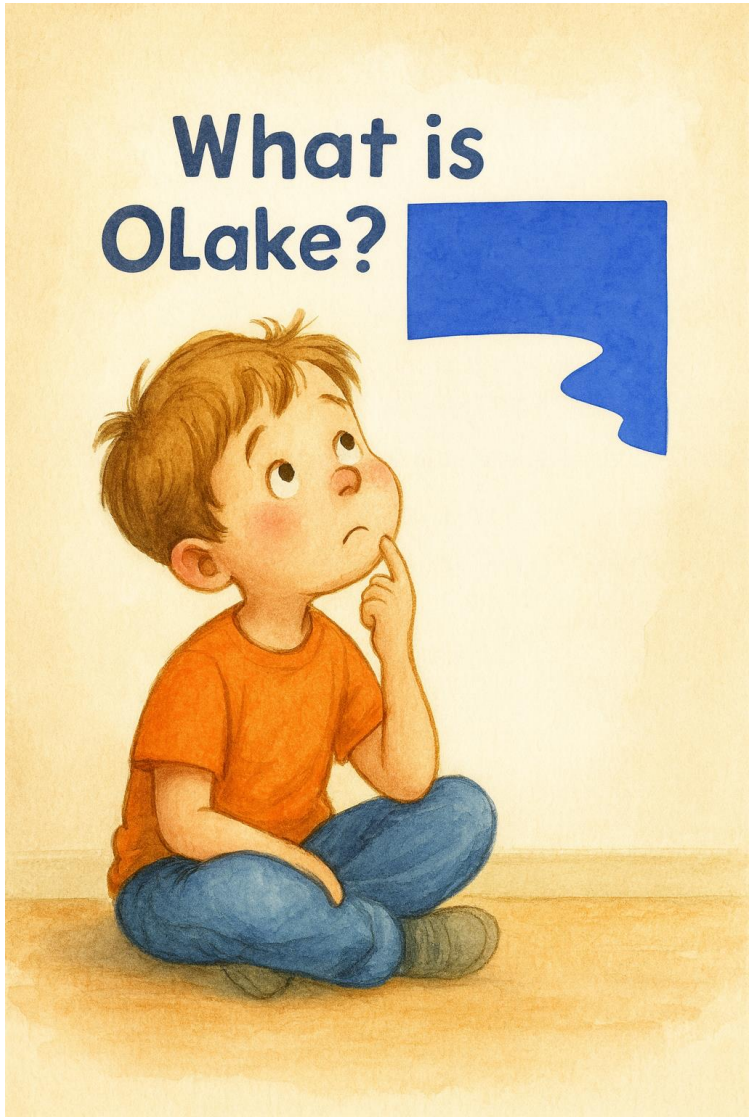
What is Clickhouse?

- Open source* OLAP database known for speed
- Very easy to get started
  - *one binary, regular SQL/Tables like RDBMS*
  - *Very popular, open, well adopted!*
- Storage Compute segregation(?)
  - *Possible with Open source, not trivial!*
- But a lot of integrations (engines, format Readers etc)
- Supports parquet, iceberg and now even writes (experimental)

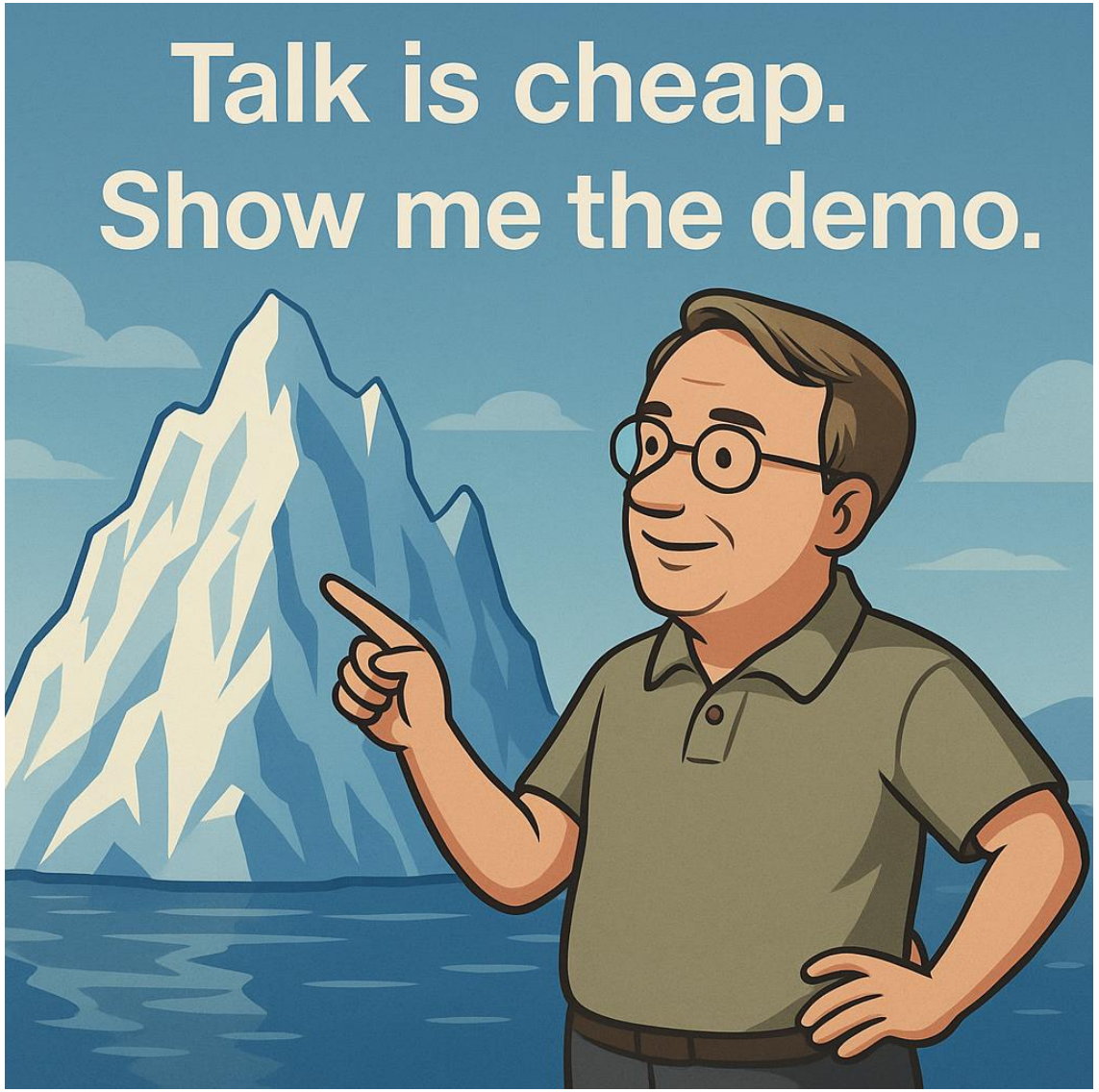


What is OLake (CDC into iceberg)?

- Open-source, high-speed **Change Data Capture** tool
- Syncs data from Postgres, MySQL, MongoDB, etc.. → Iceberg
- **Ultra-fast throughput**
- Lightweight: no Spark or Flink required
- Supports both **full load + CDC** with schema evolution
- Simple to run via Docker & easy UI/CLI



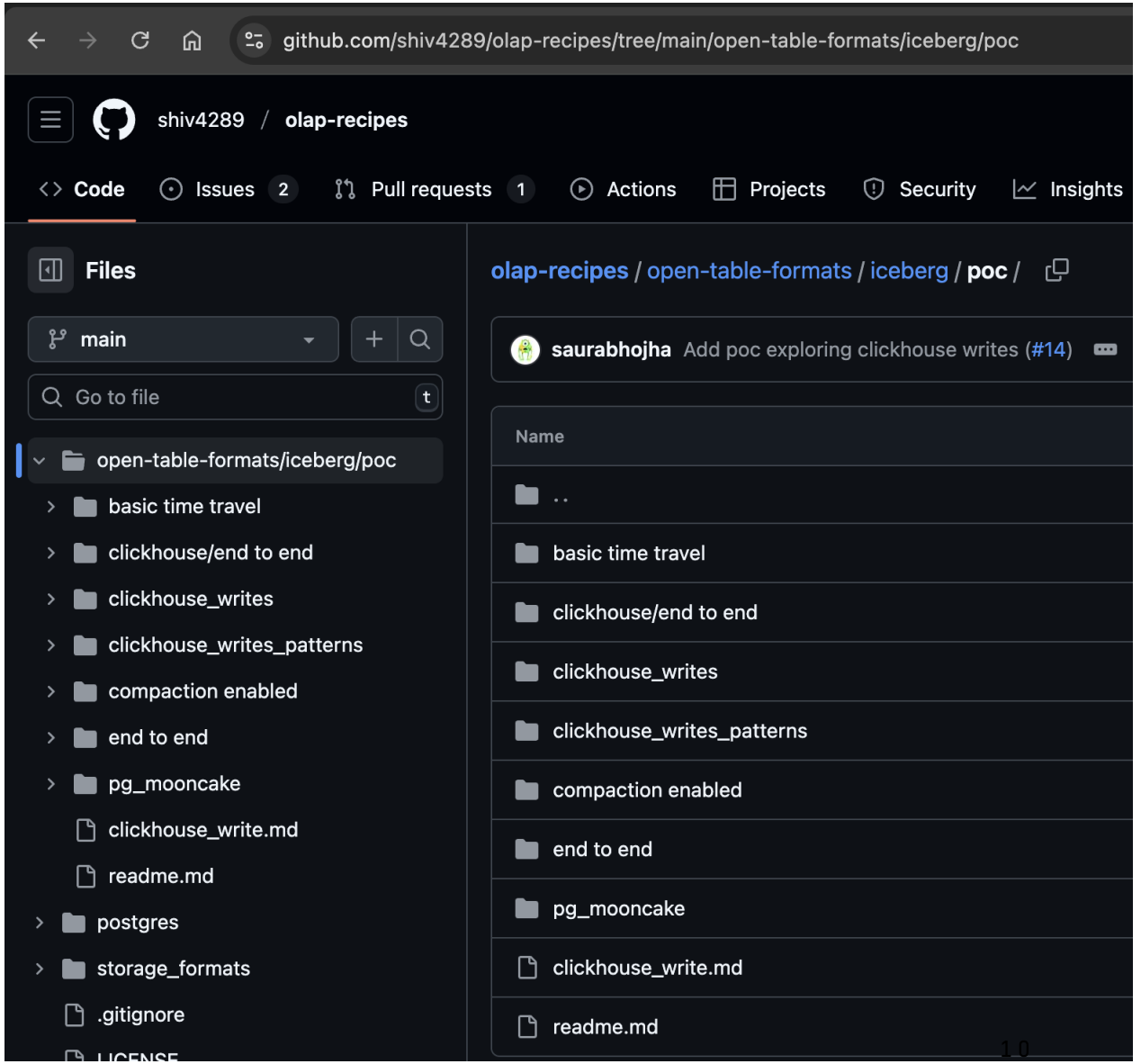
Demo Time!!



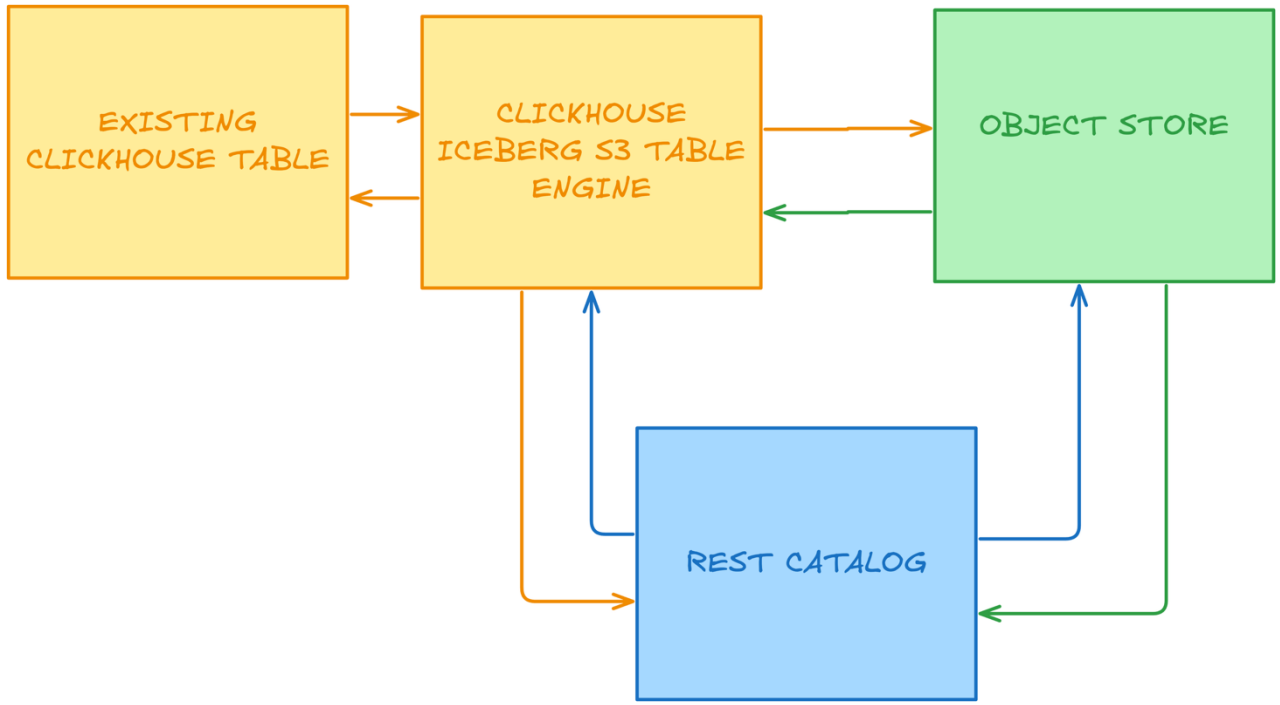
Want to get your hands dirty?

Prerequisites:

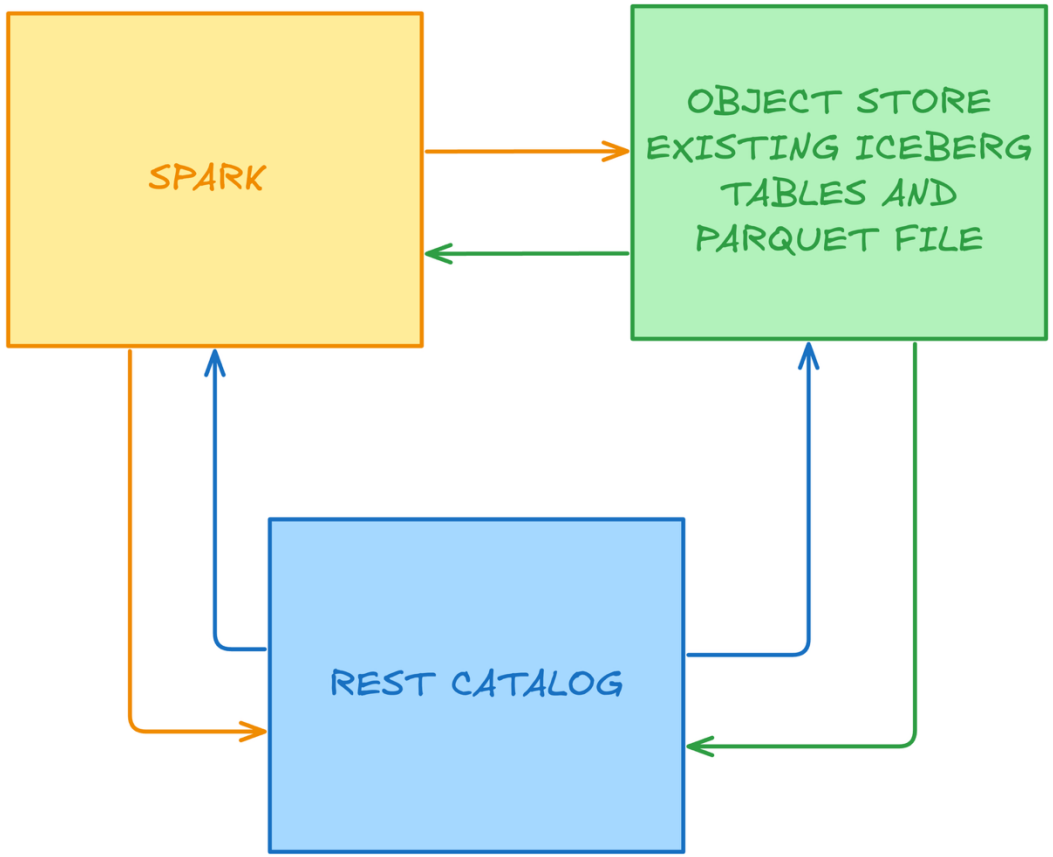
- Have a docker or equivalent setup.
- Linux / Mac OS
- Try the demo yourself !! Find it here



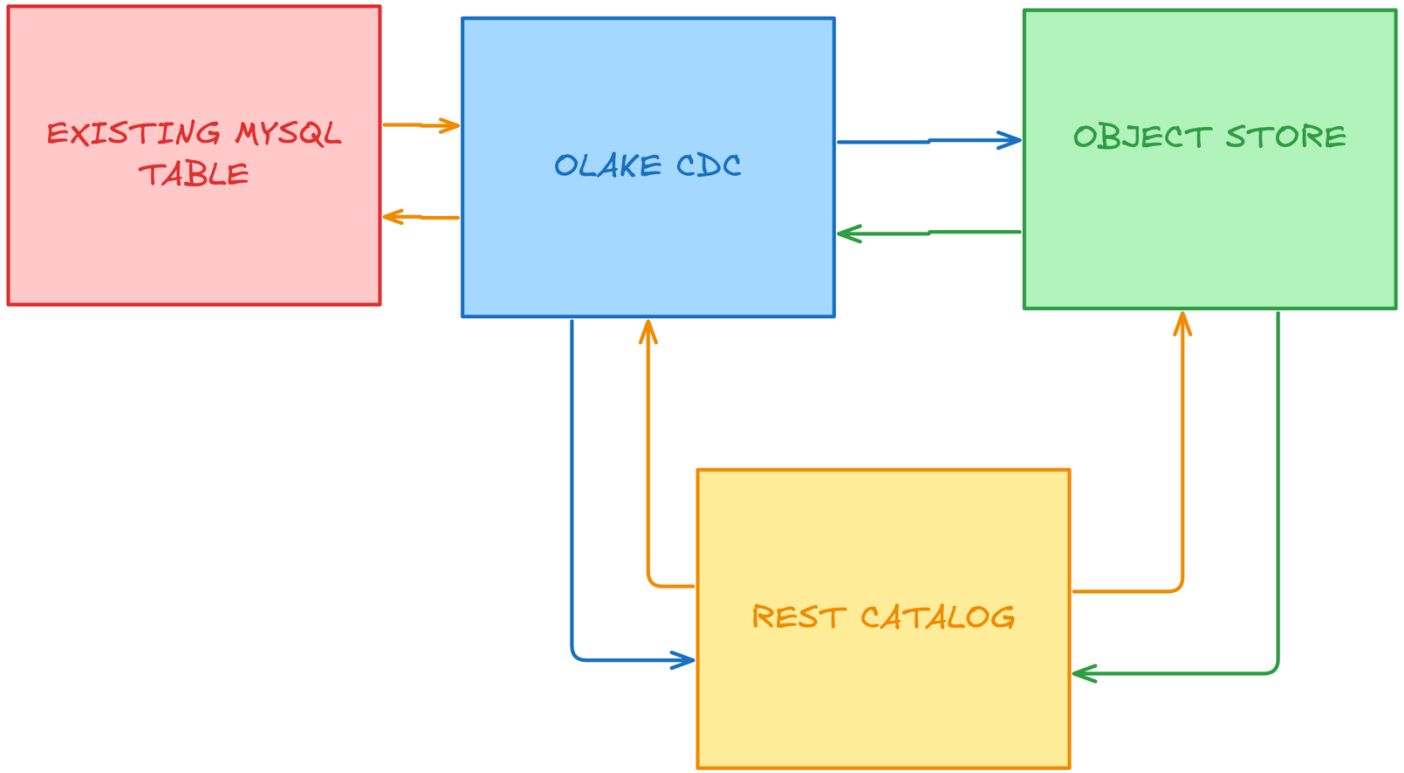
FLOW 1: DATA FROM CLICKHOUSE TO ICEBERG TABLE



FLOW 2: WRITING TO SAME ICEBERG TABLE USING SPARK



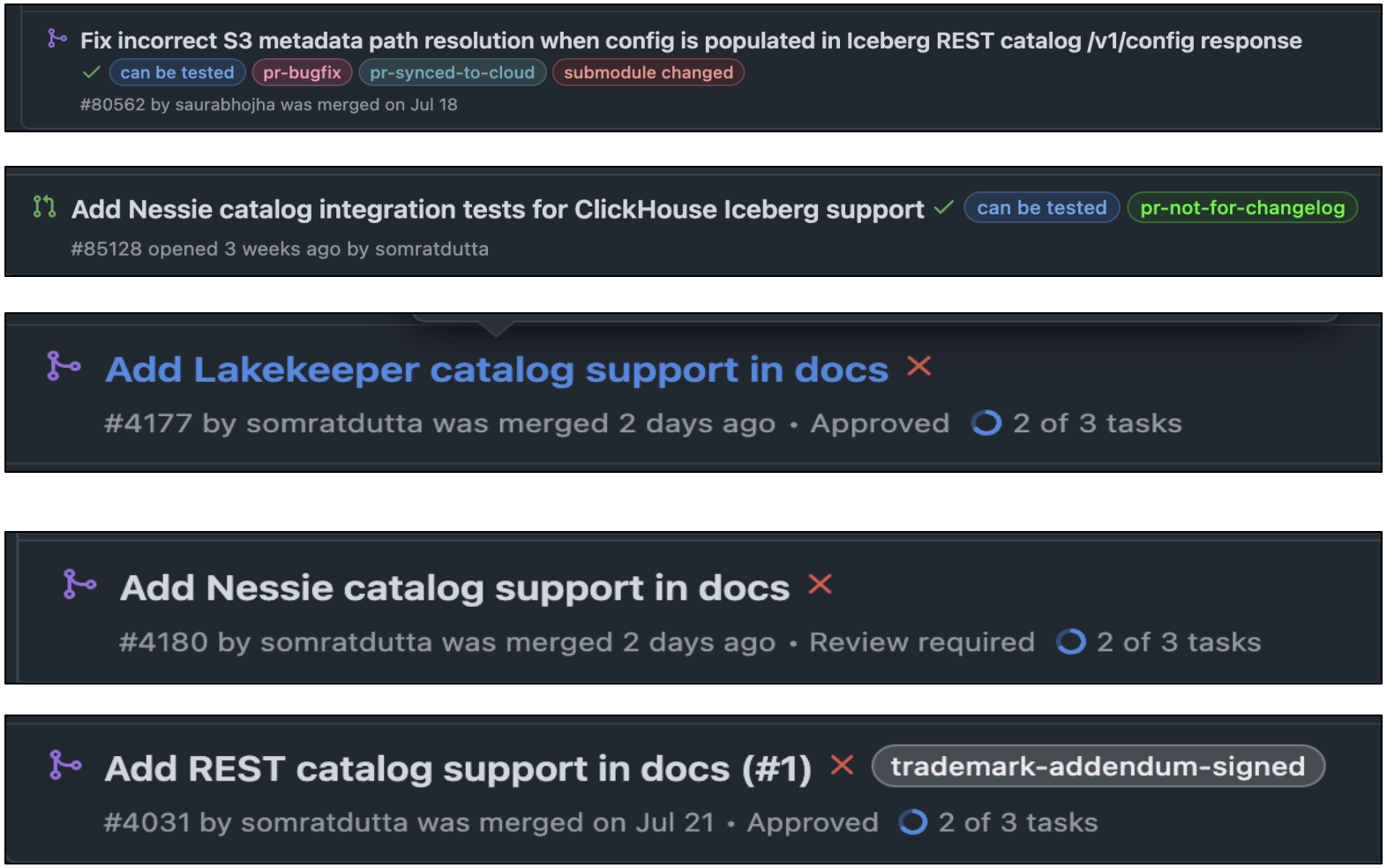
FLOW 3: WRITING TO THE SAME ICEBERG TABLE USING OLAKE CDC FROM MYSQL



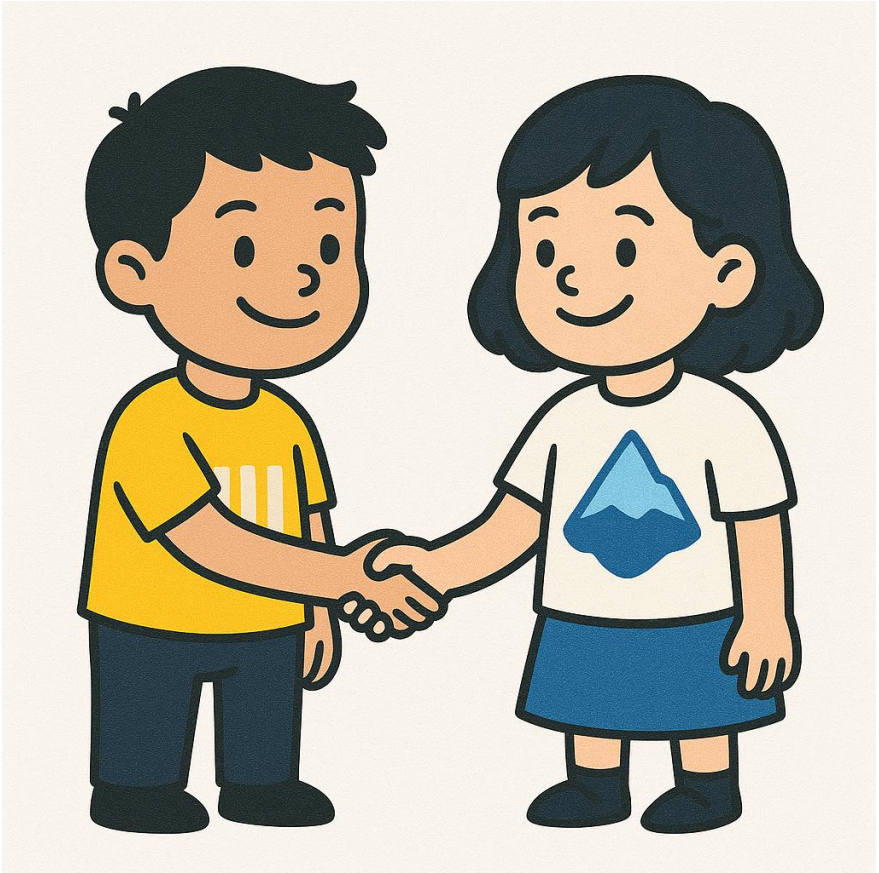
Fresh off the oven (experimental)

Did a bunch of plumbing to get here!

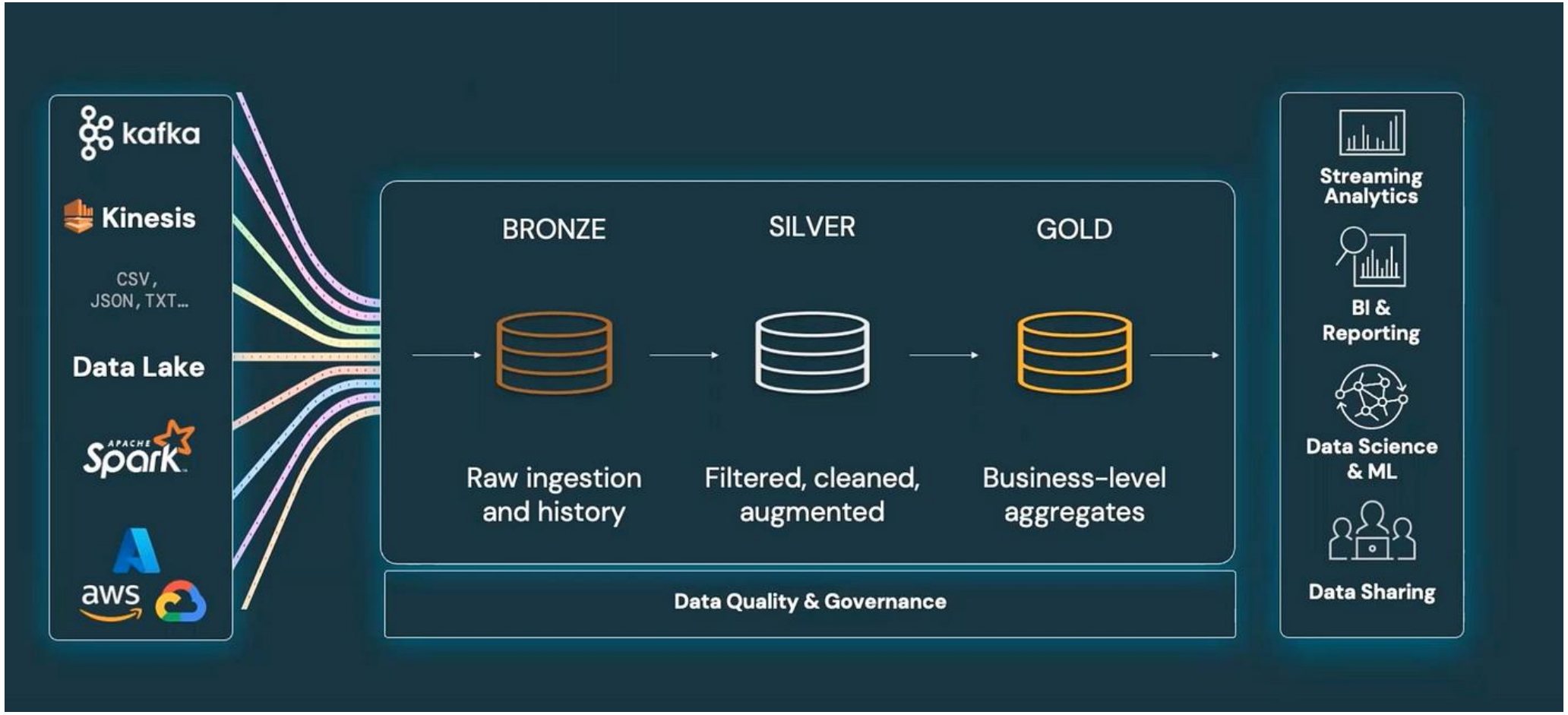
We've already merged these into the Clickhouse source code, so you can avoid running into the same challenges!!



Design Patterns

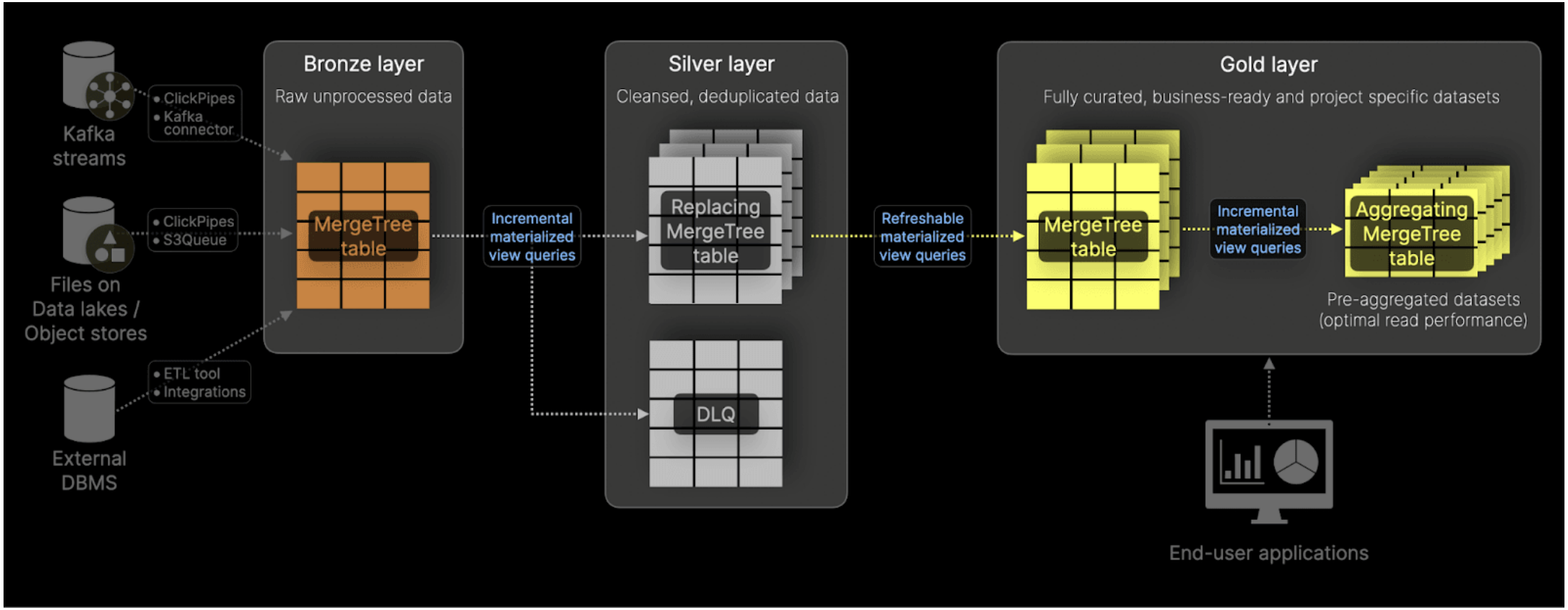


Medallion Architecture



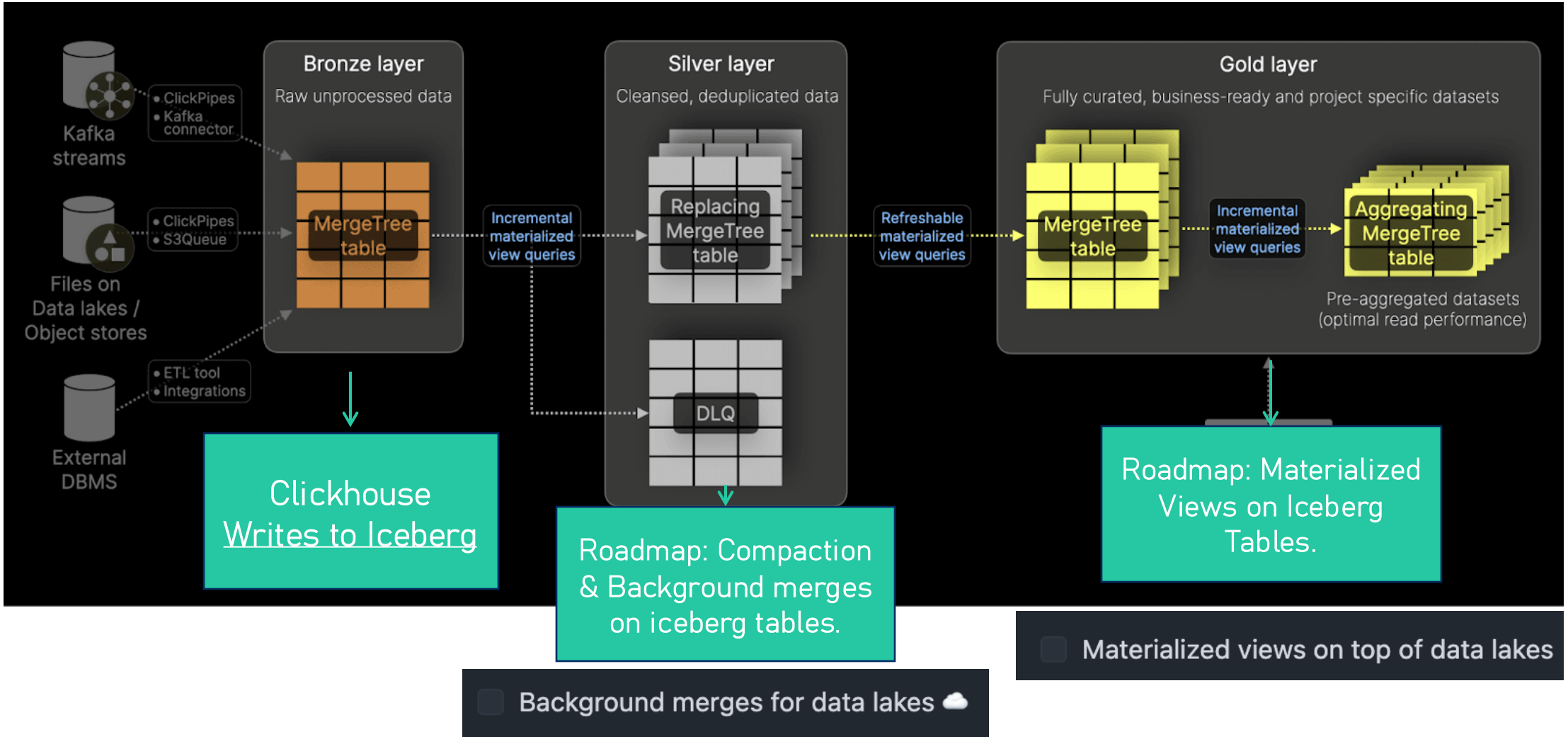
https://www.lakehousepartners.ai/post/medallion-structure

Medallion Architecture ft. Clickhouse TODAY



https://clickhouse.com/blog/building-a-medallion-architecture-with-clickhouse

Medallion Architecture ft Clickhouse / Iceberg



https://github.com/ClickHouse/ClickHouse/issues/74046

Use cases

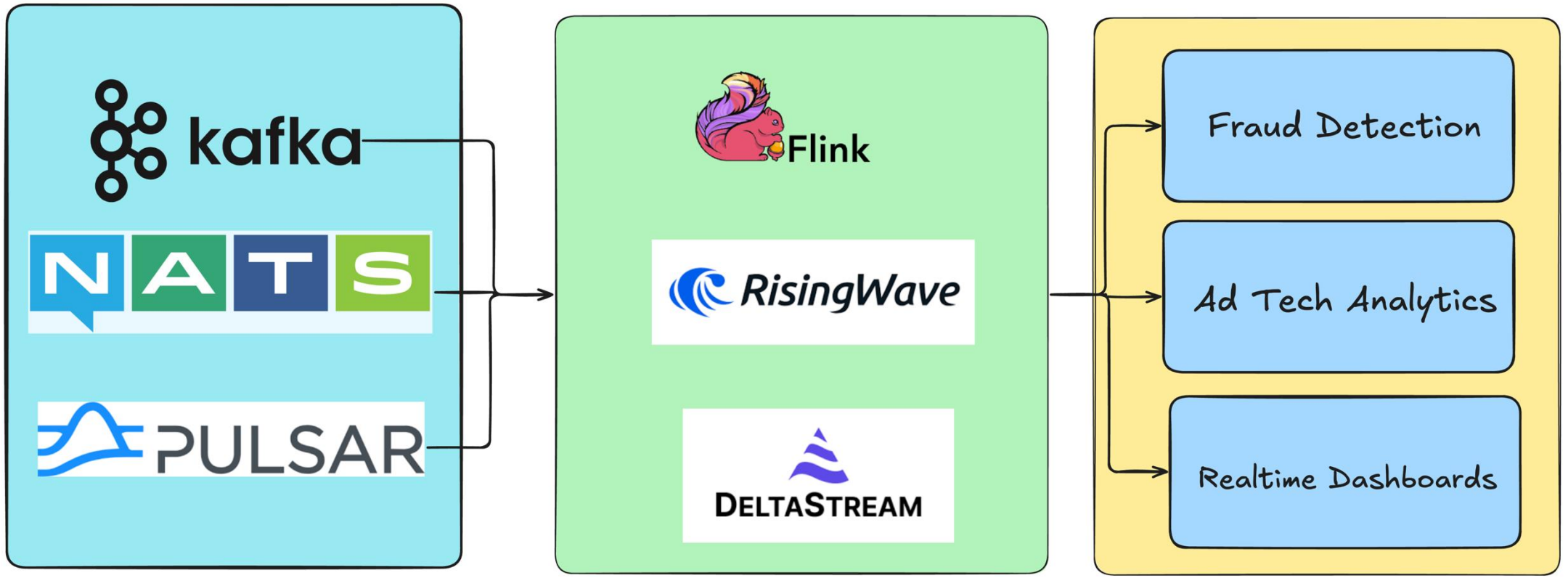
Realtime (Fraud detection- eg: credit card fraud)

BI dashboards (quarterly sales trends)

ML training pipelines

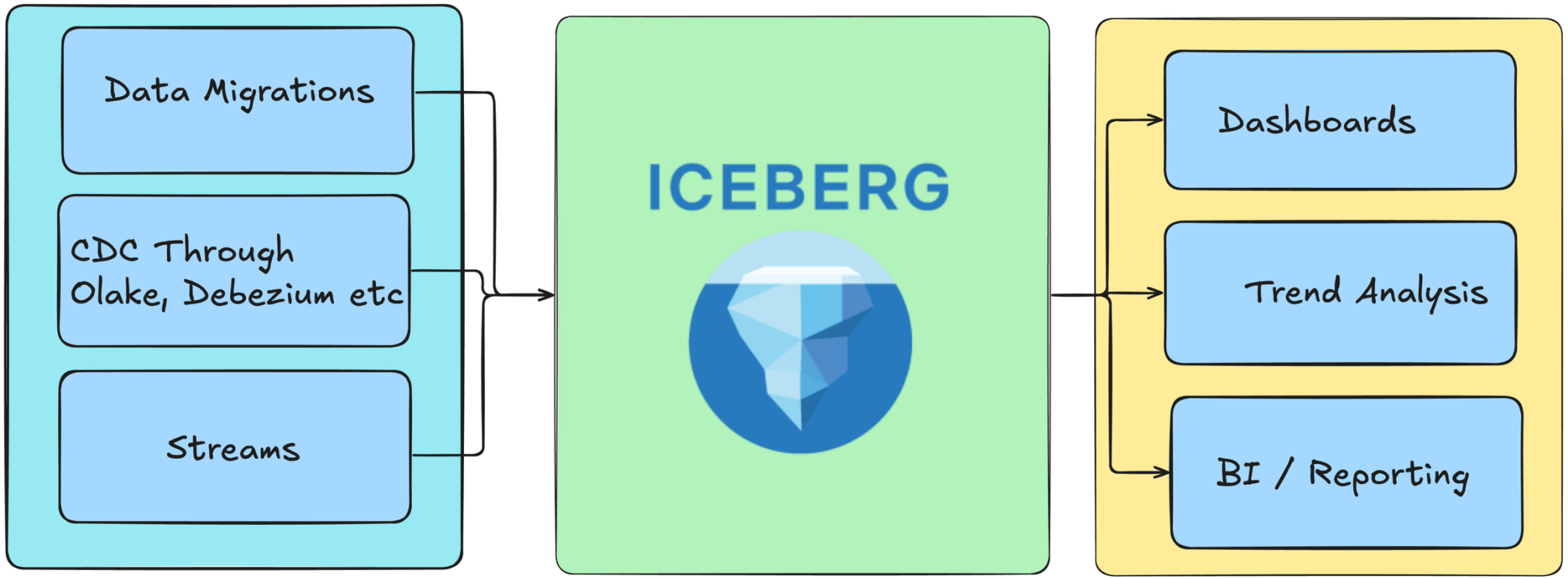
Architecture blueprints

Realtime (Fraud detection– eg: credit card fraud, Clickstream Analytics etc..)



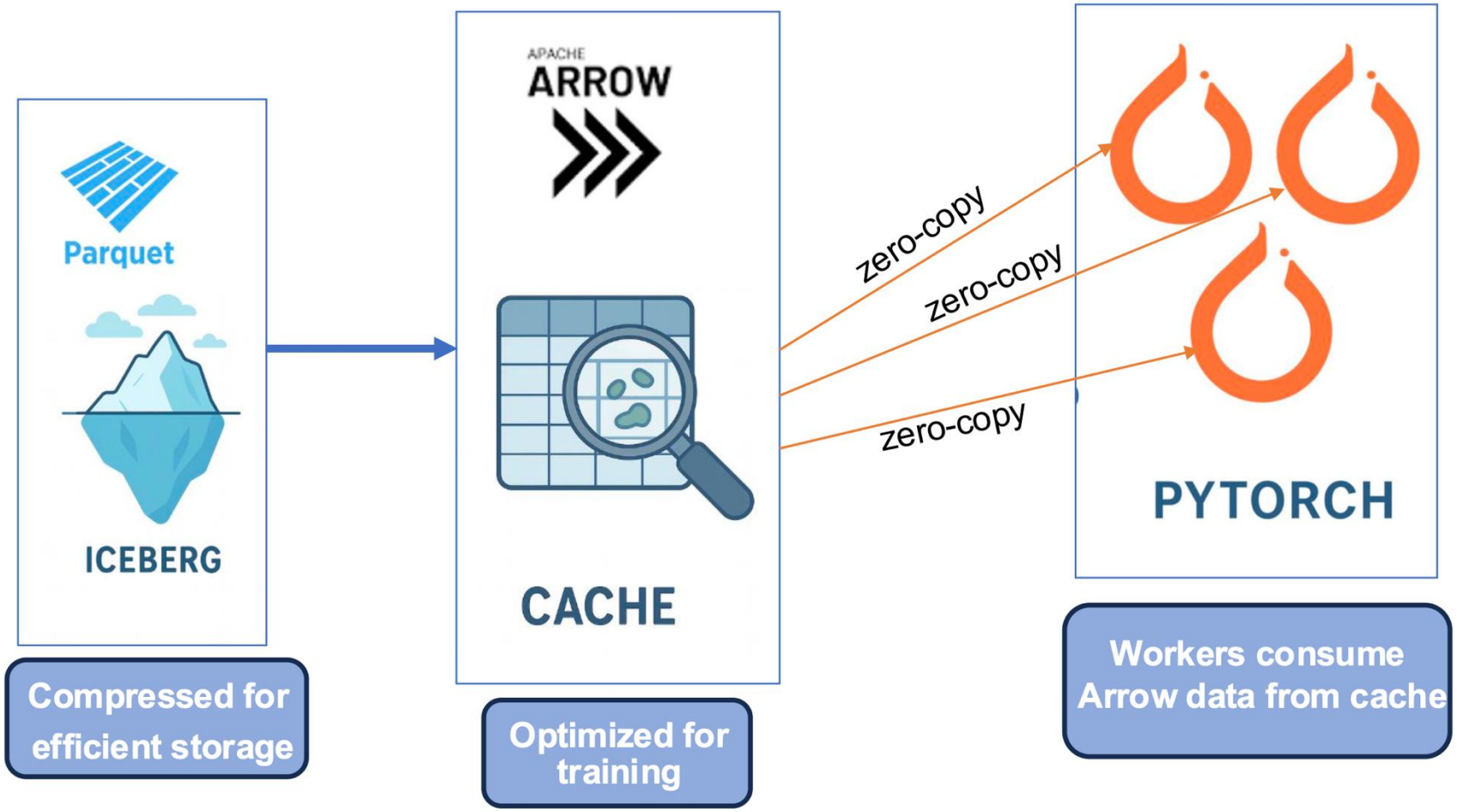
Architecture blueprints

BI dashboards (quarterly sales trends)



Architecture blueprints

ML training pipelines

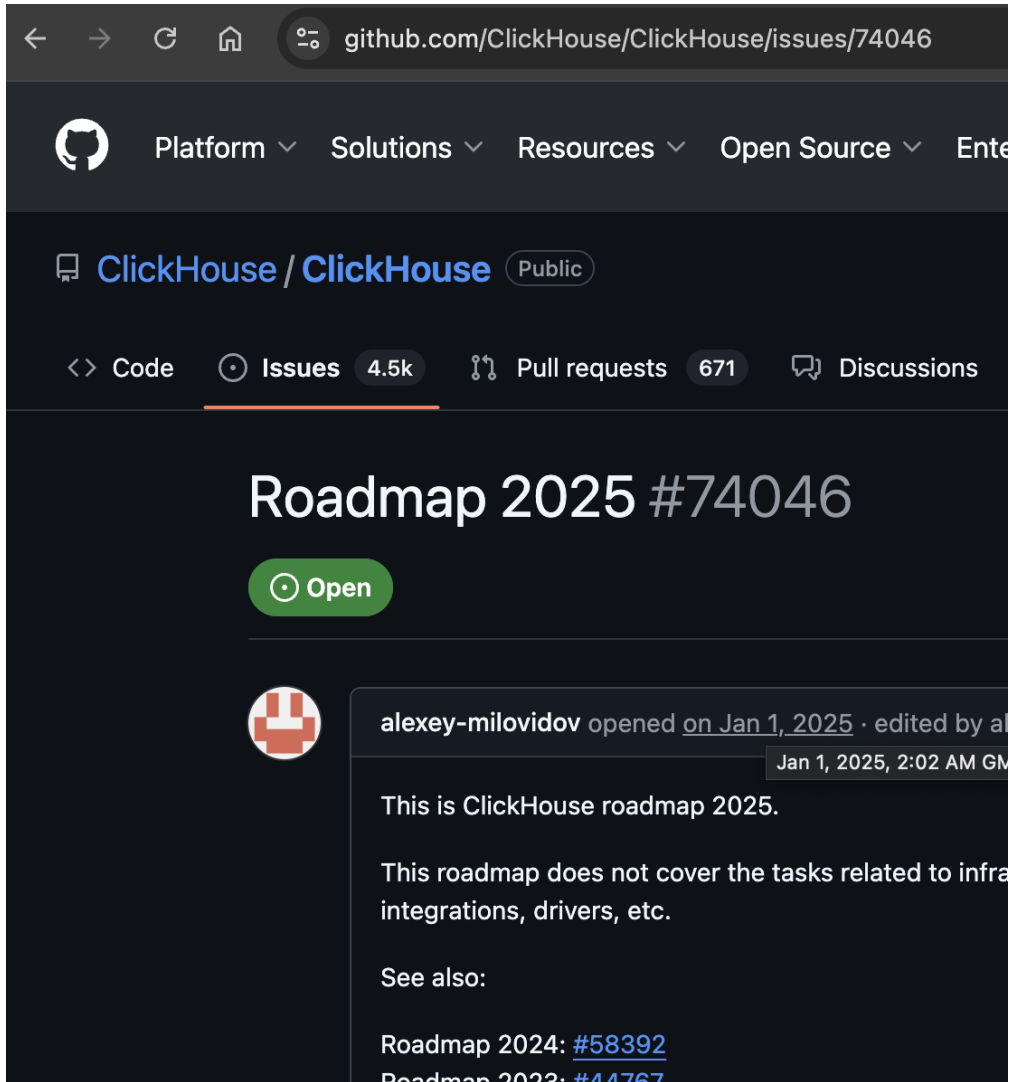


https://github.com/shiv4289/shiv-tech-talks/blob/main/kubeflow-datacache-slides.pdf

Callout for contributors

- Experimental (preview), fresh off the oven!
- By default, fields are nullable. No **required** fields yet
- Doesn't support partitioning while creating tables.
- Can't attach to an already existing table -issue here.
- *No deletes on Iceberg tables* – only INSERTs
- Can't read compressed metadata files. Fixed in master!

Clickhouse Roadmap



- [Background Merges] – Compactions & clustering for better performance.
- Introducing external materialized views for better query efficiency
- Support for Equality Deletes.
- Schema updates directly from Clickhouse.
- A [brand new parquet reader] from scratch!!
- Iceberg CDC Connector in ClickPipes (Iceberg to clickhouse native table)

https://github.com/ClickHouse/ClickHouse/issues/74046

Takeaways

Iceberg is taking off! Who wouldn't want to own data, right?

Proof of the pudding: A lot of vendors are integrating with Lakehouses

We use Clickhouse & are looking closely at Clickhouse integrations.

No better time to be a builder - Freedom of choice for query engines.

No better time to be an open-source contributor - Checkout roadmap.

Questions?

Get in Touch:

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