Real-Time Intelligence: Accelerating Insights with RisingWave

Architectural Strategy & E-Commerce Conversion Demo

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Moving from Retrospective to Reactive

Traditional batch analytics are too slow for modern conversion optimization. We are validating a stack that delivers immediate insights without the Big Data overhead.

The Solution

JetBrains Mono

RisingWave – A cloud-native streaming database compatible with PostgreSQL.

The Advantage

JetBrains Mono

High throughput with significantly lower TCO compared to legacy stacks like Flink.

The Proof

JetBrains Mono

A live E-Commerce Funnel demo showing real-time View-to-Cart and Cart-to-Buy conversion rates.

RisingWave: Streaming Made as Simple as SQL

Traditional Database

JetBrains Mono

Static Data. Batch Queries.

RisingWave

JetBrains Mono

Dynamic Streams. Continuous Queries.

- **Definition:** A cloud-native streaming database that uses SQL as the primary interface.
- **The Paradigm:** Treats data streams as tables. No complex Java/Scala; just standard SQL queries that update automatically.
- **Capabilities:** Powering real-time dashboards, ad-hoc queries, and alert systems immediately upon ingestion.

Strategic Comparison: RisingWave vs. Apache Flink

Apache Flink (The Incumbent)

JetBrains Mono

- **Pros:** Mature ecosystem, massive scale.
- **Cons:** High operational complexity, heavy infrastructure footprint, requires specialized Java/Scala talent.

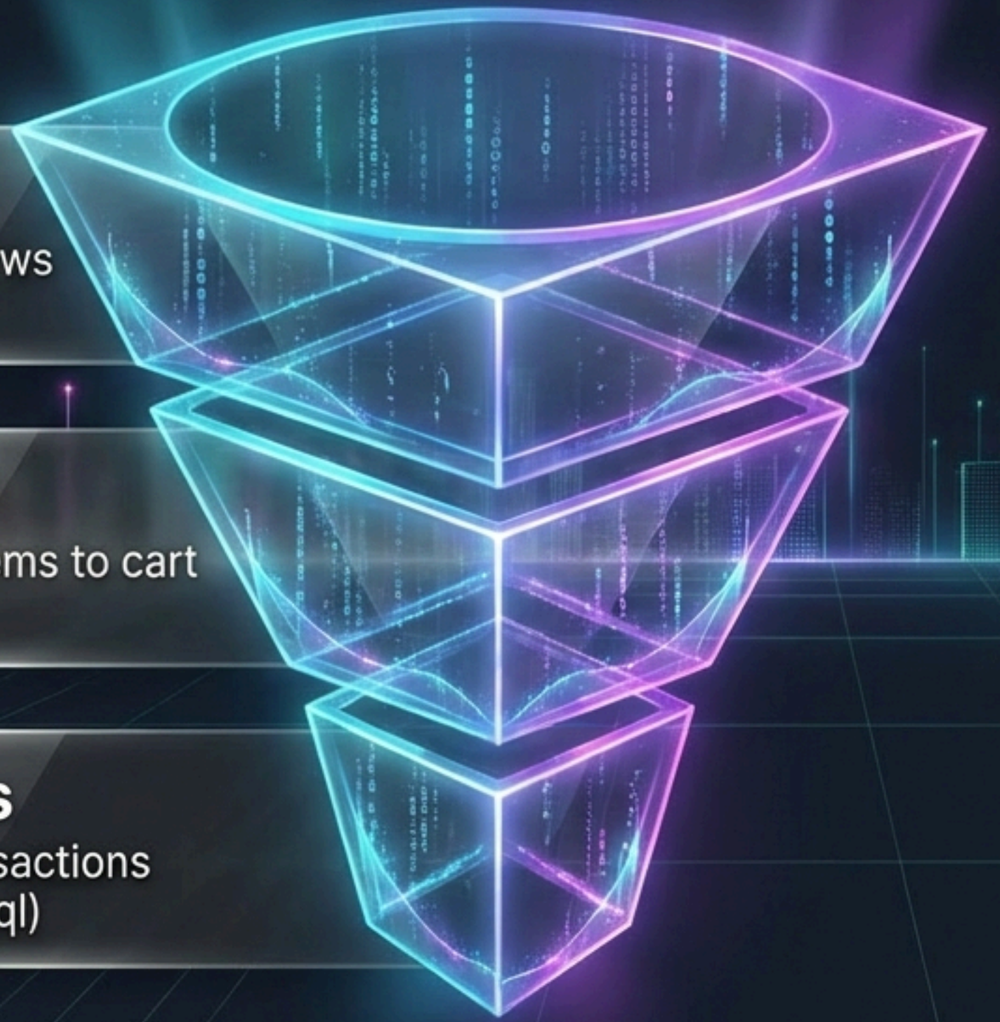
RisingWave (The Agile Challenger)

JetBrains Mono

- **Pros:** PostgreSQL Compatible (leverages existing SQL talent), Cloud-native architecture (separation of compute/storage), significantly lower TCO.
- **Cons:** Newer ecosystem.

Verdict: RisingWave offers faster time-to-market for agile real-time applications.

The Business Case: E-Commerce Conversion Funnel



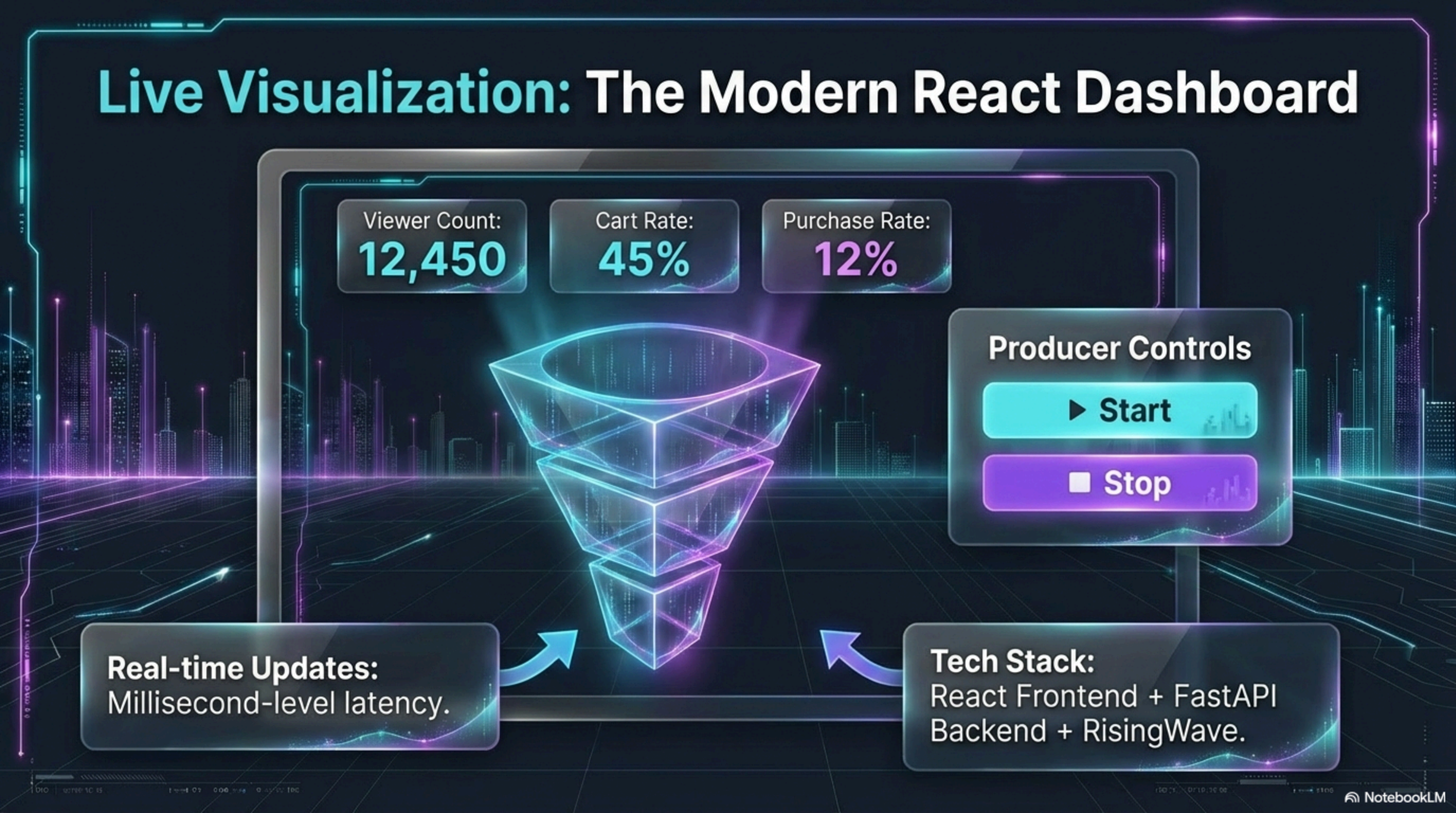
Viewers
Unique page views (src_page.sql)

Carters
Users adding items to cart (src_cart.sql)

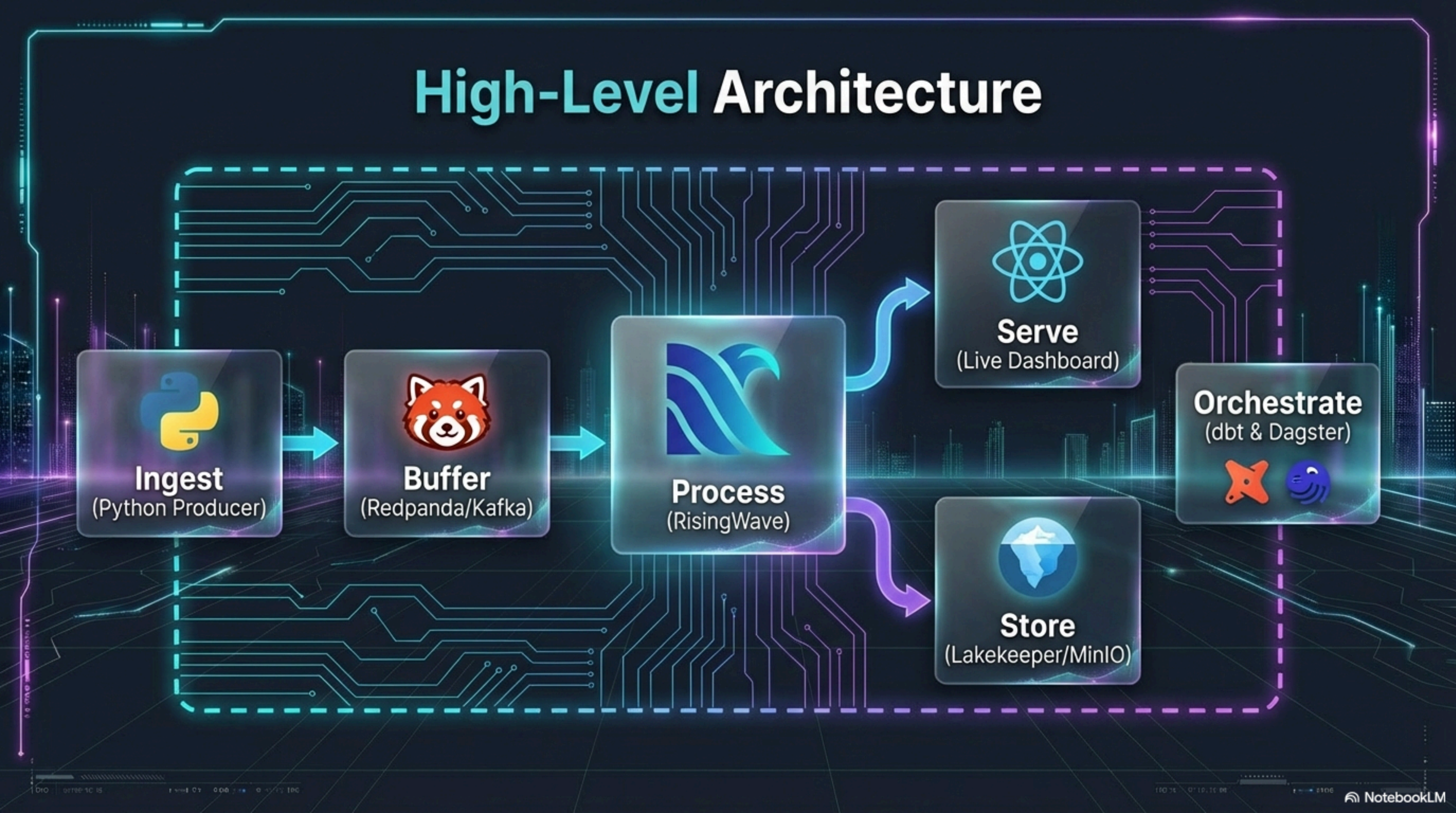
Purchasers
Completed transactions (src_purchase.sql)

The Goal:
Instantly calculate **view_to_cart_rate** and **cart_to_buy_rate** to identify drop-offs in real-time.

Live Visualization: The Modern React Dashboard



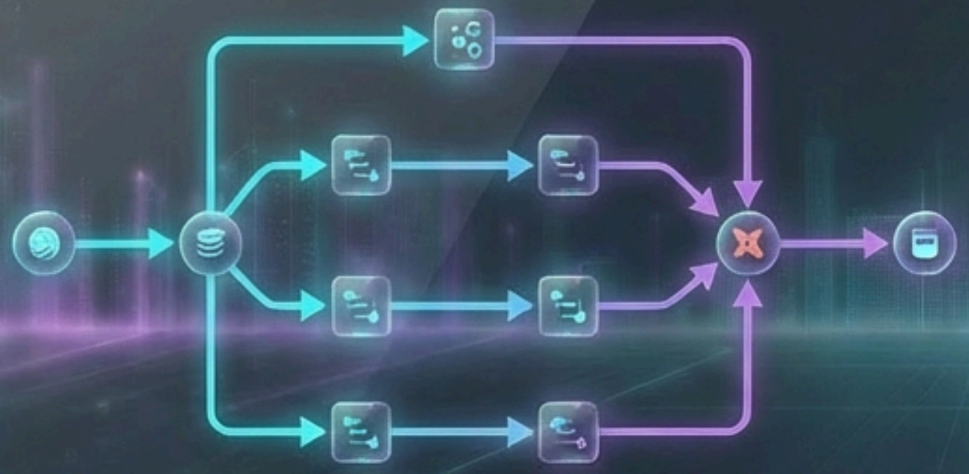
High-Level Architecture



The Data Journey: From Event to Materialized View

Orchestration & Quality Assurance

Orchestration (Dagster)



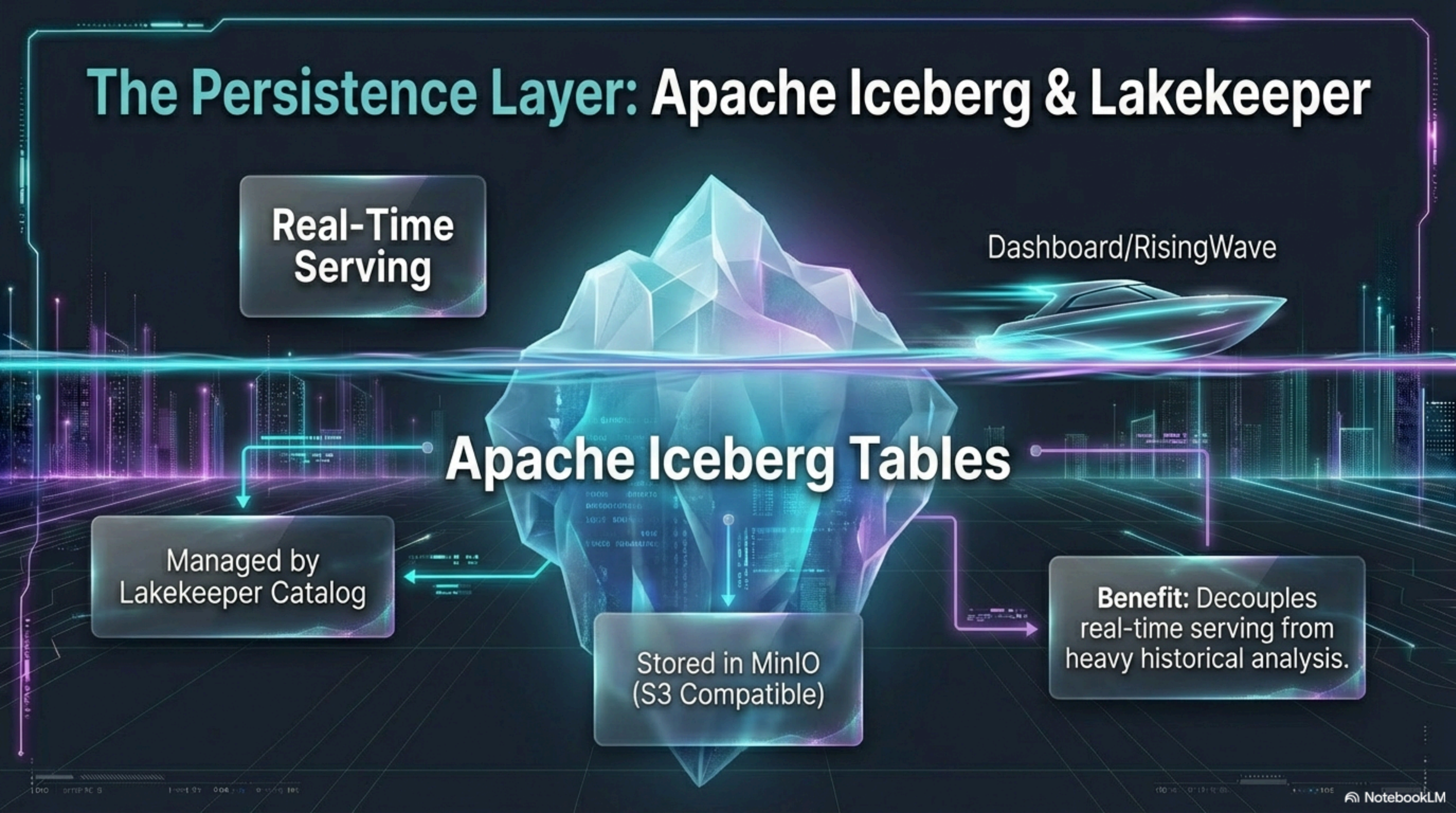
Manages pipeline lifecycle and ensures reliability.

Transformation (dbt)

```
SELECT *
FROM {{ source('risingwave', 'page_views') }}
```

Applies version control and testing to streaming logic.

The Persistence Layer: Apache Iceberg & Lakekeeper



Advanced Analytics: DuckDB & Spark Integration

DuckDB: Ad-hoc queries on Iceberg tables (scripts/query_raw_iceberg.py)

Spark: Complex user behavior modeling and historical research.

Key Strategic Takeaways

- **Simplicity:** Complex streaming logic implemented using standard SQL and dbt.
- **Performance:** Achieved millisecond latency using Redpanda and RisingWave's compute-storage separation.
- **Scalability:** Production-ready architecture separating speed (RisingWave) from storage (Iceberg/MinIO).

Ready to Scale Real-Time Intelligence

The architecture demonstrated is modular, scalable, and ready for pilot deployment.

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