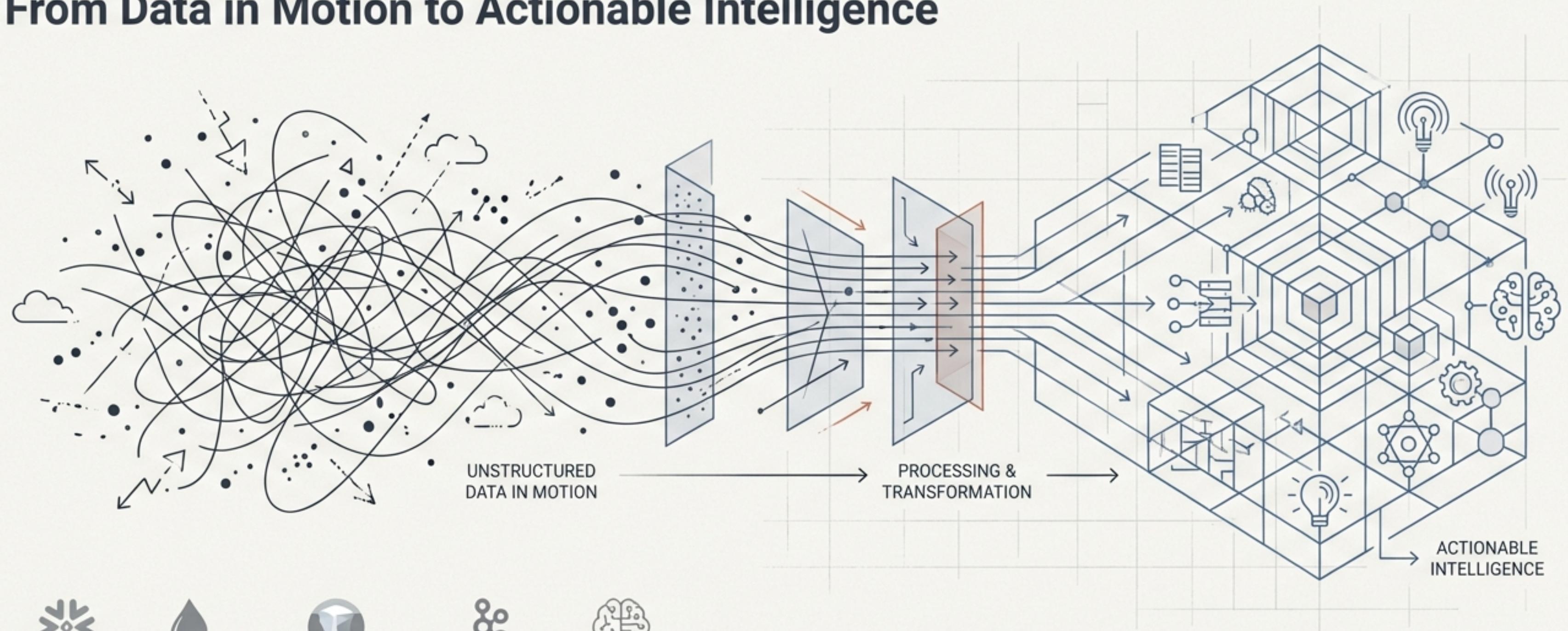


The SNACK-AI Stack: An Architectural Pattern for Real-Time Intelligent Applications

From Data in Motion to Actionable Intelligence



Snowflake



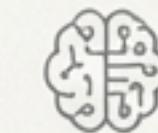
Apache NiFi



Apache Iceberg



Apache Kafka



Cortex AI

The Modern Enterprise Faces a Critical Data Chasm

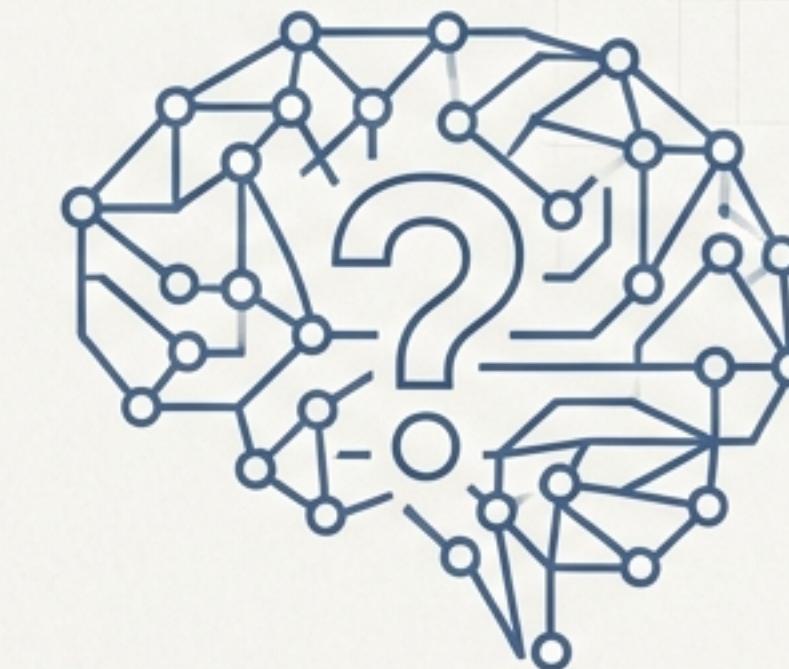
“In the modern enterprise, the gap between the relentless velocity of real-time data streams and the insatiable data appetite of Generative AI represents a formidable challenge.”

Challenge 1: Data Deluge



Organizations are inundated with unstructured data that holds immense potential.

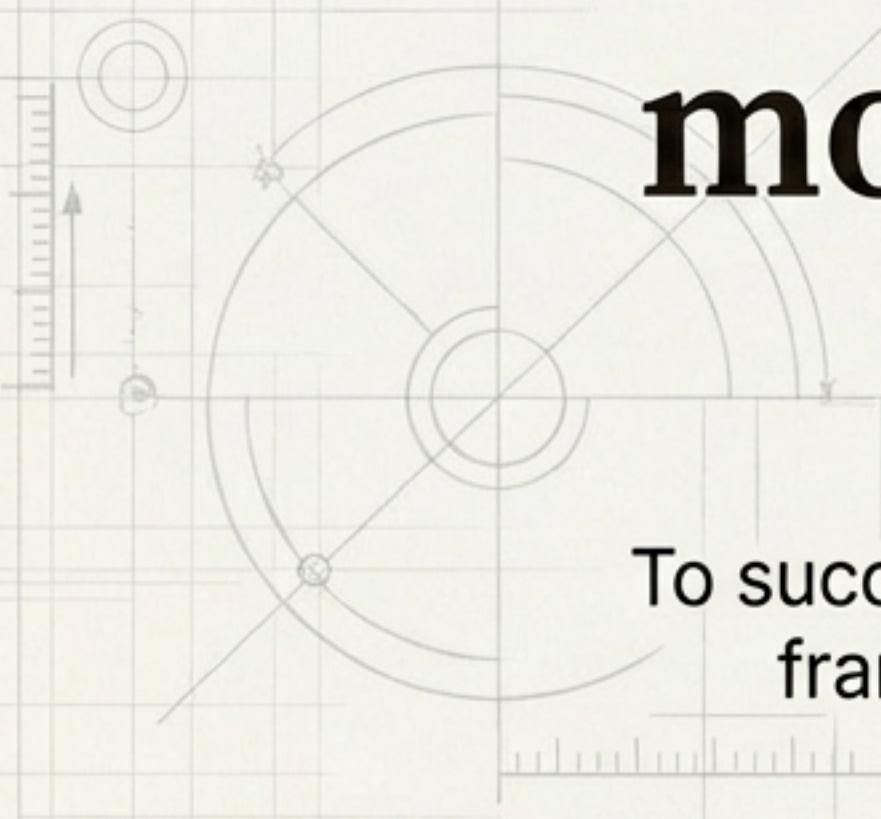
Challenge 2: Untapped Value



This data is difficult to harness for intelligent applications.

This is Fundamentally a Data Architecture Problem

“The successful deployment of AI is, therefore, fundamentally a data architecture problem, not just a model-training problem.”



To succeed, organizations require a robust, scalable, and coherent framework to ingest, process, and activate data in motion.

Introducing SNACK-AI: An Integrated Architectural Pattern

An open, end-to-end solution that integrates Snowflake, NiFi, Apache Iceberg, Cortex, and Kafka to power AI applications.

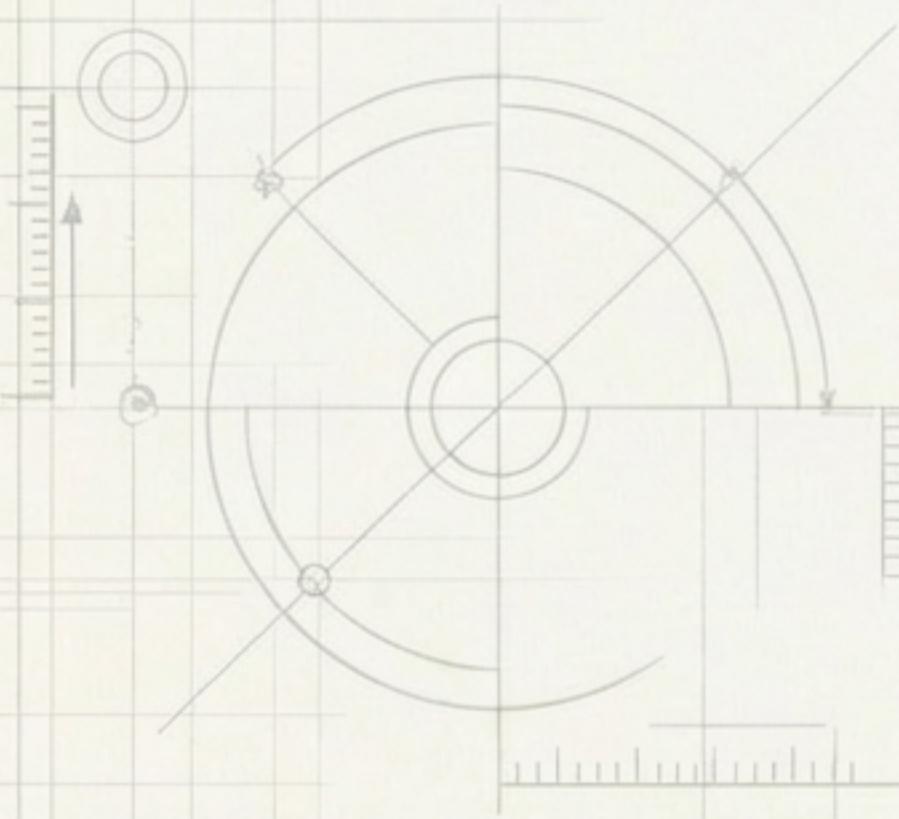
S Snowflake  snowflake®

N NiFi  nifi

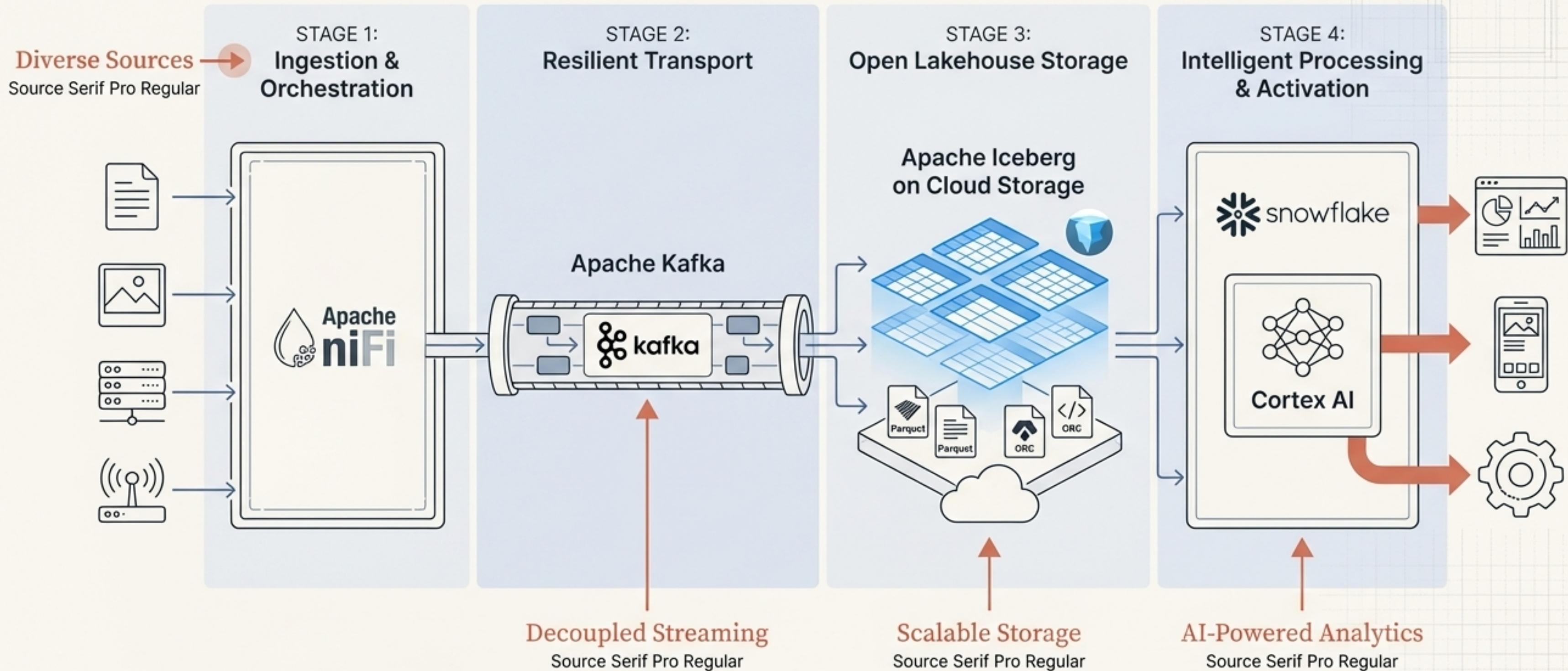
A Apache Iceberg 

C Cortex 

K Kafka  apache kafka.



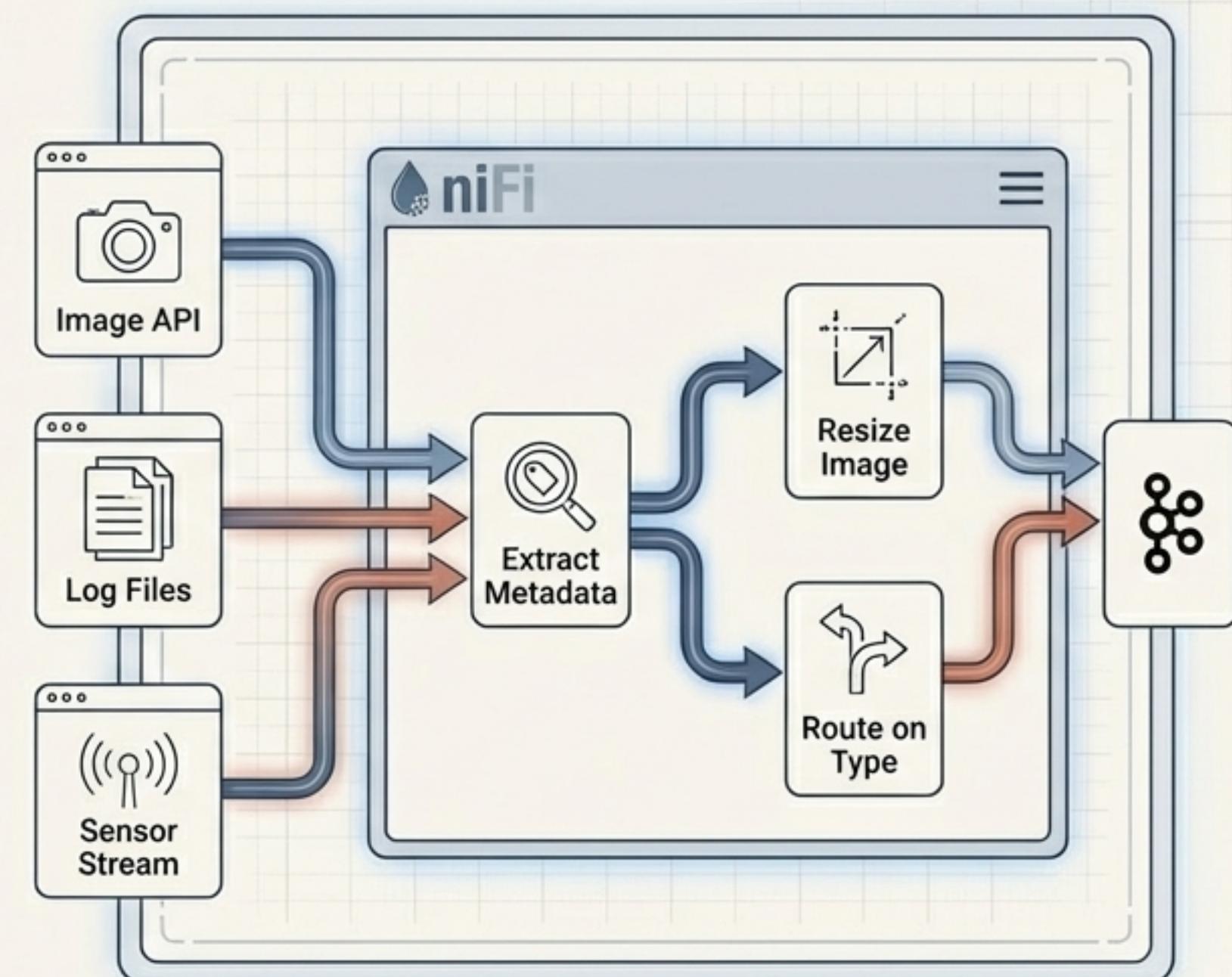
The Complete SNACK-AI Data Flow



N is for NiFi: Taming the Unstructured Torrent

Apache NiFi orchestrates the complex ingestion and routing of diverse data.

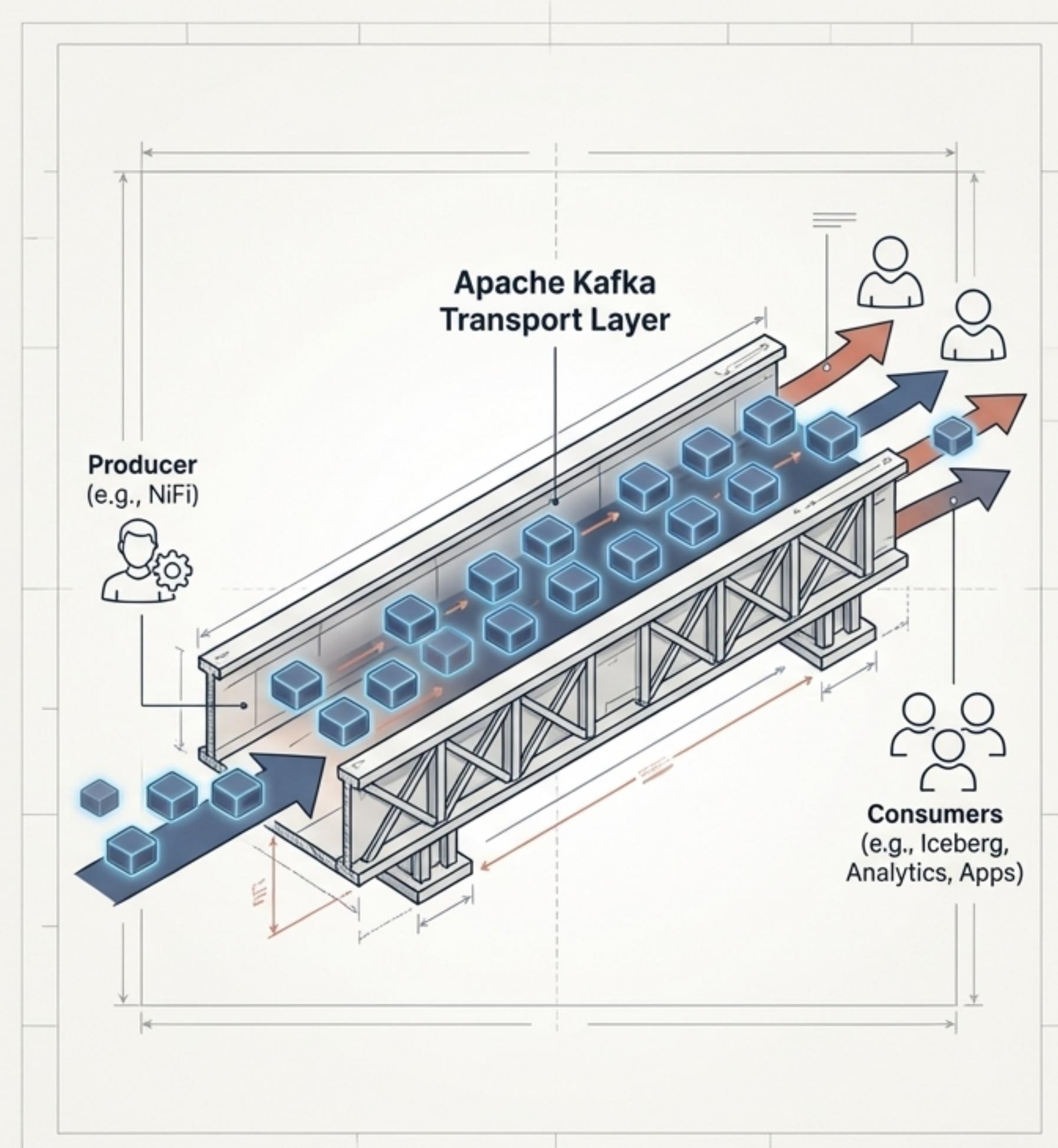
- **Handles Variety:** Built to manage a wide array of data types and sources, from images and documents to logs and sensor feeds.
- **Visual Programming:** Its flow-based interface allows for rapid development and management of complex data pipelines without deep coding.
- **Guaranteed Delivery:** Provides robust error handling and data provenance.



K is for Kafka: The Resilient Data Backbone

Apache Kafka provides a resilient, decoupled transport layer for data streams.

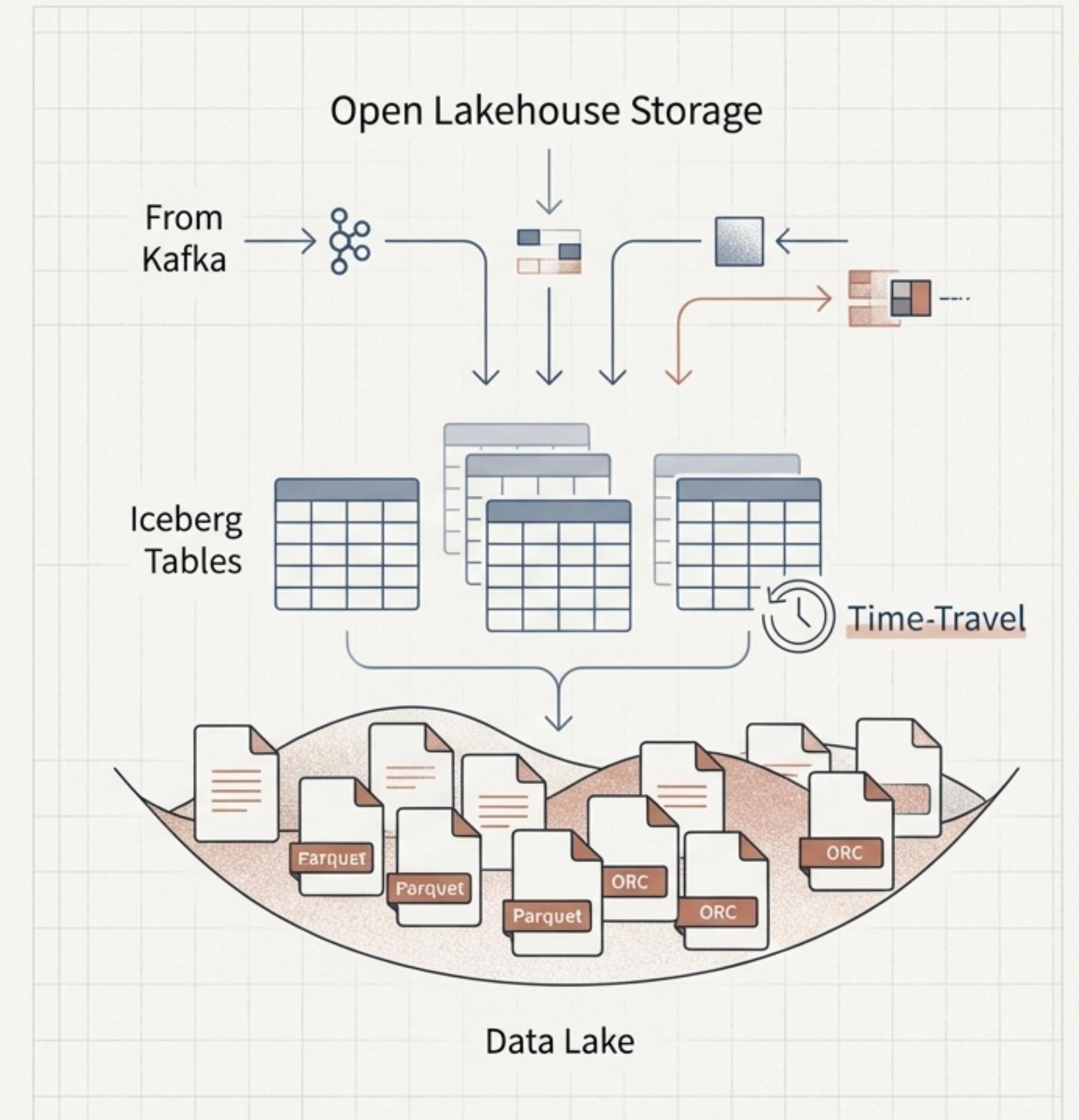
- **Acts as a Buffer:** Protects the system from data loss during spikes in volume or downstream failures.
- **Decouples Systems:** Allows producers (like NiFi) and consumers (like systems writing to Iceberg) to operate at their own pace.
- **Enables Real-Time:** Provides a high-throughput, low-latency backbone for streaming data.



A is for Apache Iceberg: The Open Lakehouse Foundation

Apache Iceberg offers a reliable, open table format for huge analytic datasets within a data lakehouse.

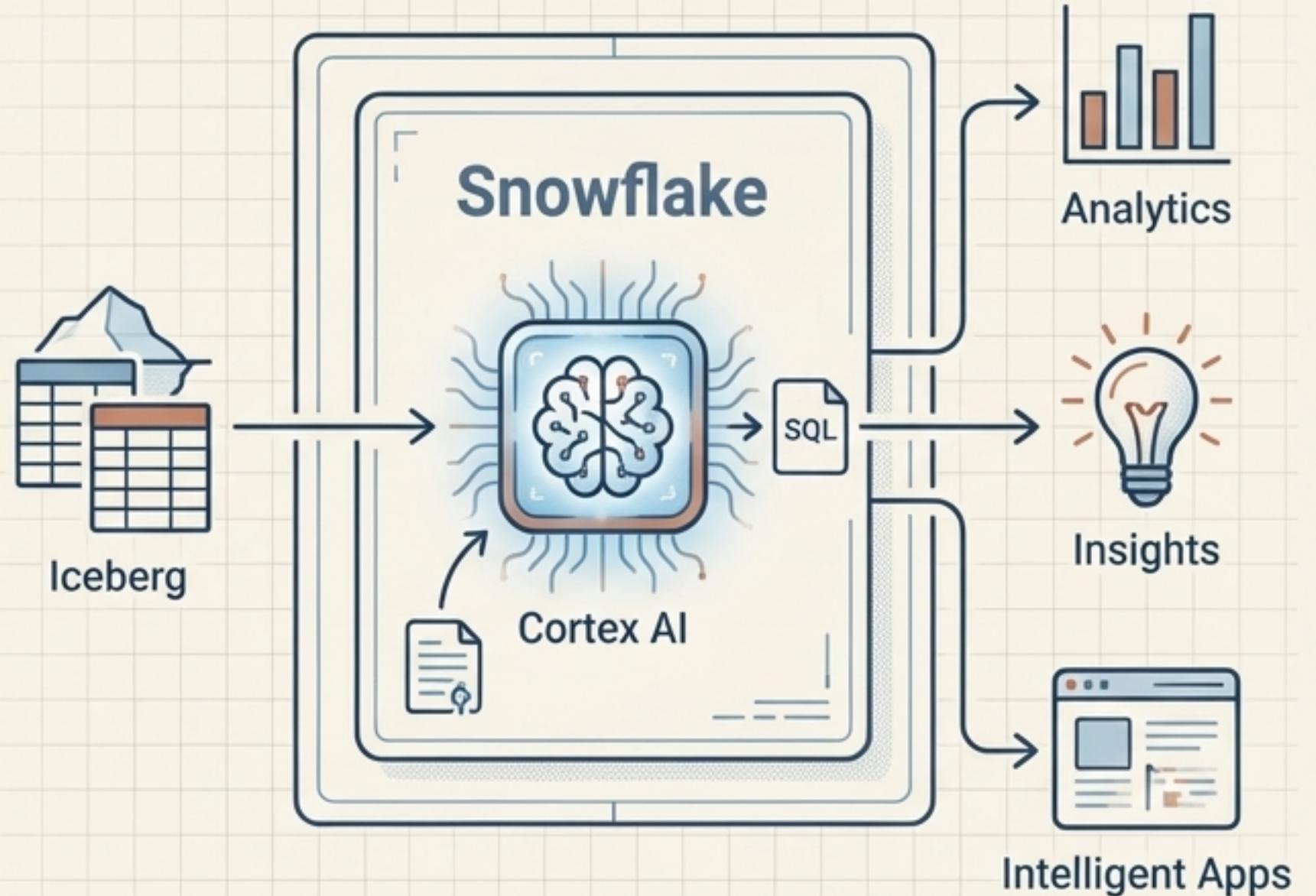
- **Warehouse Reliability on the Lake:** Brings ACID transactions, schema evolution, and time-travel capabilities to raw data files in the data lake.
- **Prevents Vendor Lock-in:** As an open standard, it ensures data is accessible by multiple query engines, not just one.
- **Performance at Scale:** Optimized for high-performance analytics on massive datasets.



S & C for Snowflake & Cortex: The Intelligence Engine

Snowflake, powered by its Cortex AI services, delivers the integrated platform for intelligent processing and application delivery.

- **Unified Platform:** Combines data warehousing, analytics, and AI processing in a single, scalable environment.
- **From Raw Data to Value:** This is where data is transformed, analyzed, and used to train and run AI/ML models.
- **Serverless AI:** Cortex provides easy access to LLMs and other ML functions via simple SQL, accelerating the development of intelligent applications.



The SNACK-AI Flow: From Ingestion to Intelligence



1. Ingest & Route

NiFi captures diverse, unstructured data.

2. Transport & Buffer

Kafka reliably streams the data in real-time.

3. Store & Structure

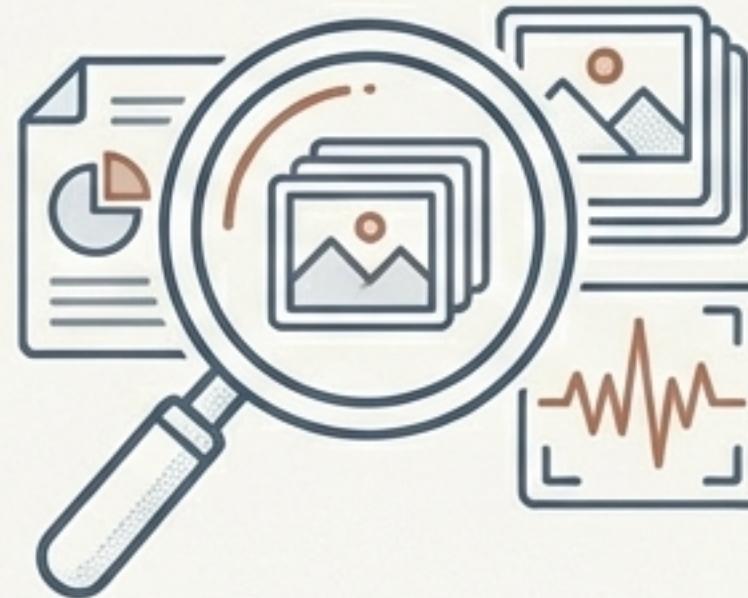
Apache Iceberg organizes the data in an open lakehouse.

4. Process & Activate

Snowflake and Cortex run analytics and AI to generate actionable intelligence.

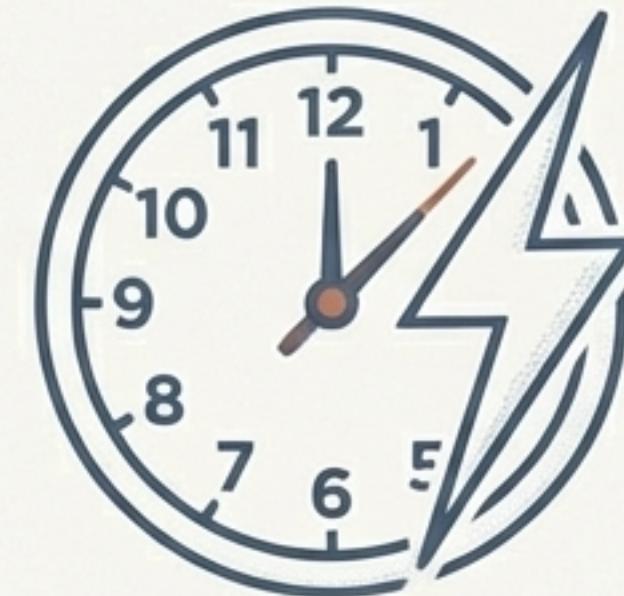
Each component performs a critical, specialized function, creating a seamless and powerful end-to-end pipeline.

The Payoff: Key Benefits of the SNACK-AI Pattern



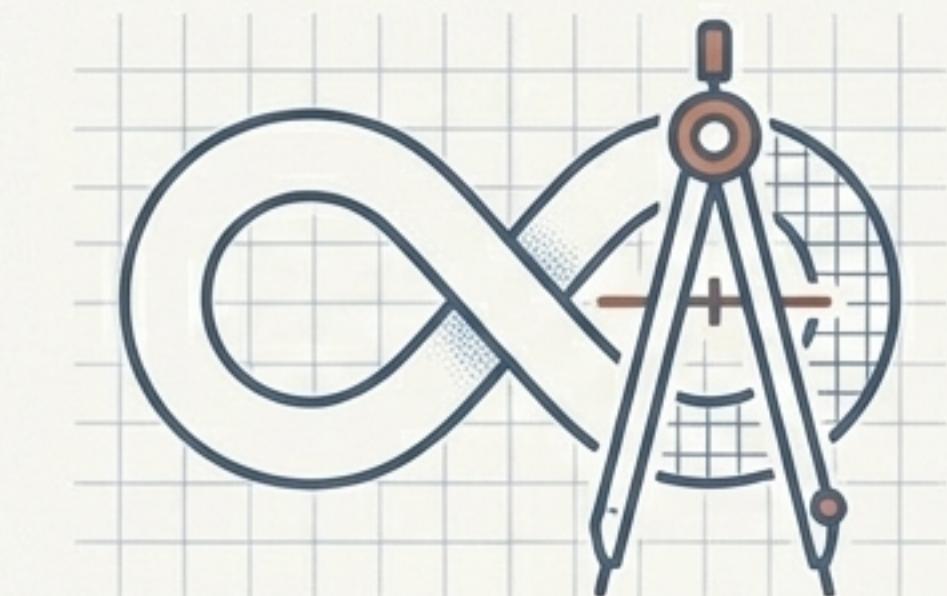
Harness Unstructured Data

Finally unlock the value hidden in images, documents, logs, and sensor feeds for AI.



Power Real-Time Intelligent Apps

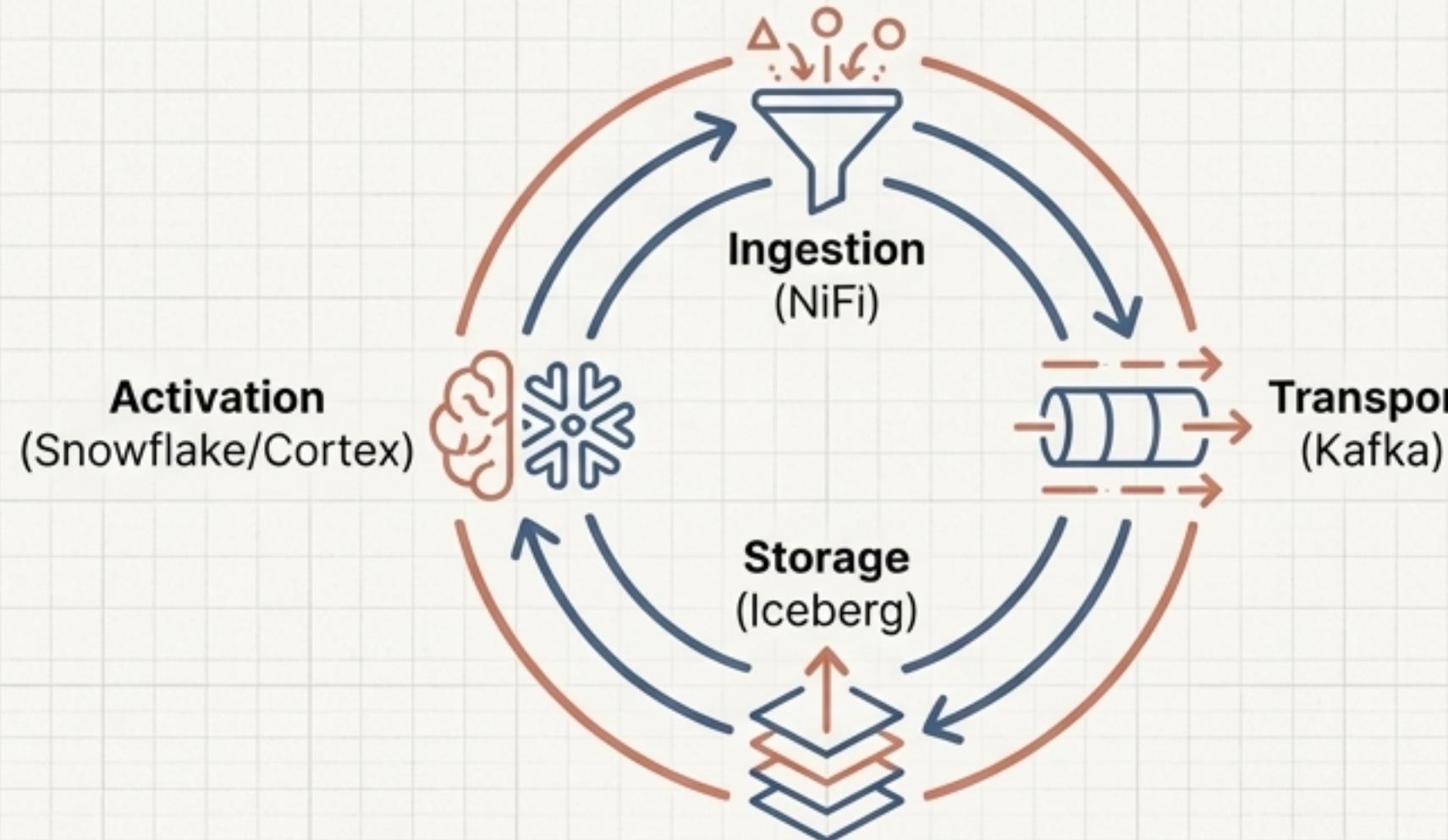
Build a new class of applications that can react and respond to events as they happen.



Create a Scalable & Future-Proof Architecture

- **Open:** Built on leading open-source standards (Apache) to prevent lock-in.
- **Scalable:** Each component can be scaled independently to meet demand.
- **Coherent:** Provides a complete, end-to-end solution for the entire AI data lifecycle.

SNACK-AI: The Architectural Pattern for the AI-Driven Enterprise



SNACK-AI provides a repeatable, open, and powerful pattern for closing the gap between real-time data velocity and the demands of modern AI. It moves beyond individual technologies to offer a comprehensive data architecture.

Explore the full implementation,
diagrams, and resources:

github.com/tspannhw/SNACK-AI

