Scottsdale Kafka Meetup

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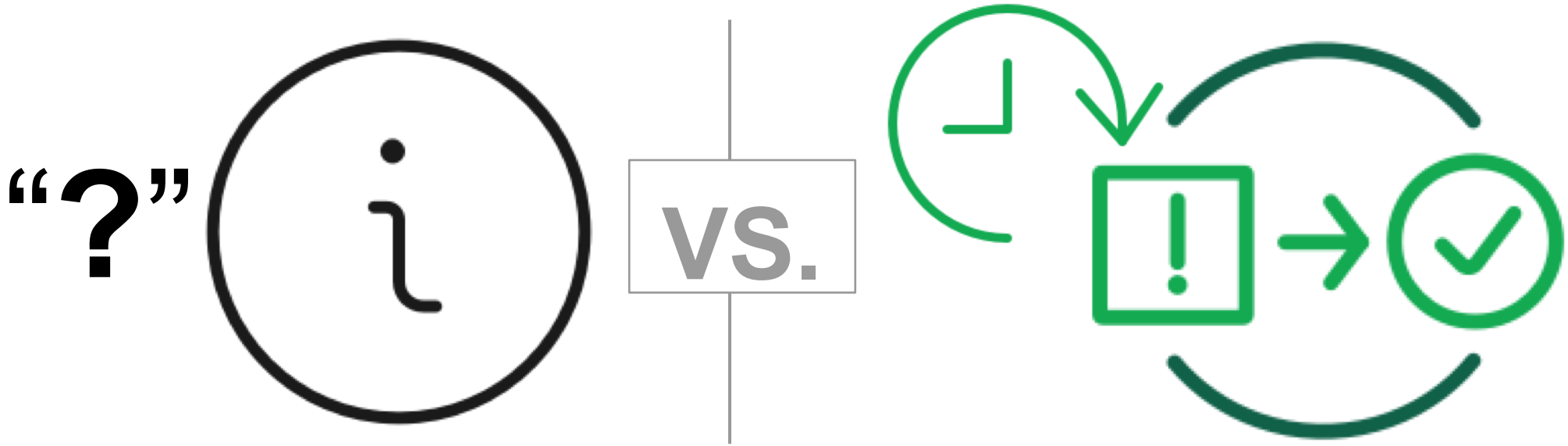
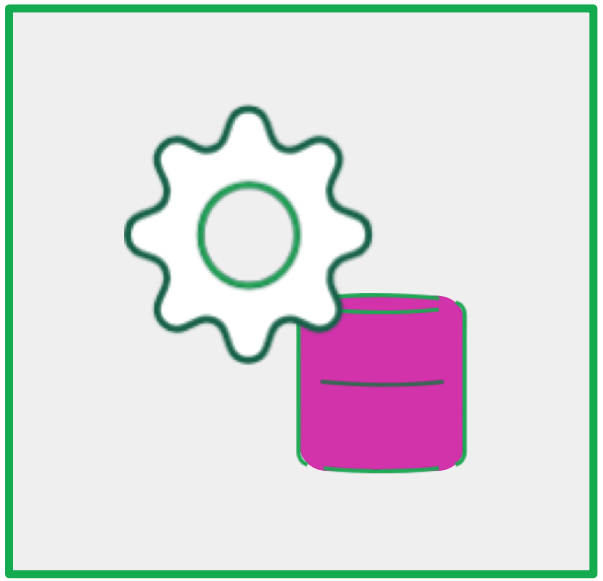
Agenda

- Event Driven Architecture
- Event Driven Architecture and MongoDB
- MongoDB Connector for Apache Kafka
- Demonstration
- Q & A

Real Time...and Request-Driven vs. Event-Driven



Major Driver of Real Time: Microservices



- **Microservices have emerged** as an architecture for iterating on apps quickly, aligned well with the Agile and DevOps movements
- **Microservices must communicate** with each other in real time; otherwise the architecture ceases to work

Core Building Block of Real Time: An Event

Atomic

Something happened; an event is the atomic unit representing what occurred

Related

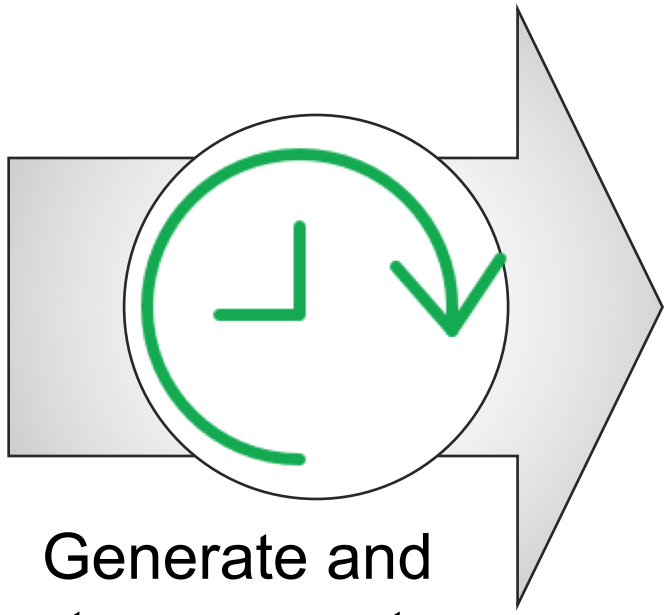
An event rarely stands alone; it's nearly always part of an event stream or sequence

Behavioral

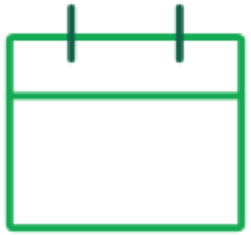
Event streams/sequences create an accumulation of facts that captures behavior

Event-Driven Architecture Defined

Producers



Generate and stream events in real time



Consume events at their own pace (which can be real time)

Consumers

Elements of Event-Driven

Event Producers generate events that place messages into a message queue or stream

The system shepherds events into logical streams called **Event Types or Topics**

Event Consumers (apps and services) listen for and react to events appended to these topics

Decoupling enables the system to grow and shrink in response to changing demand; lets services evolve independently; and more

Elements of Event-Driven (continued)

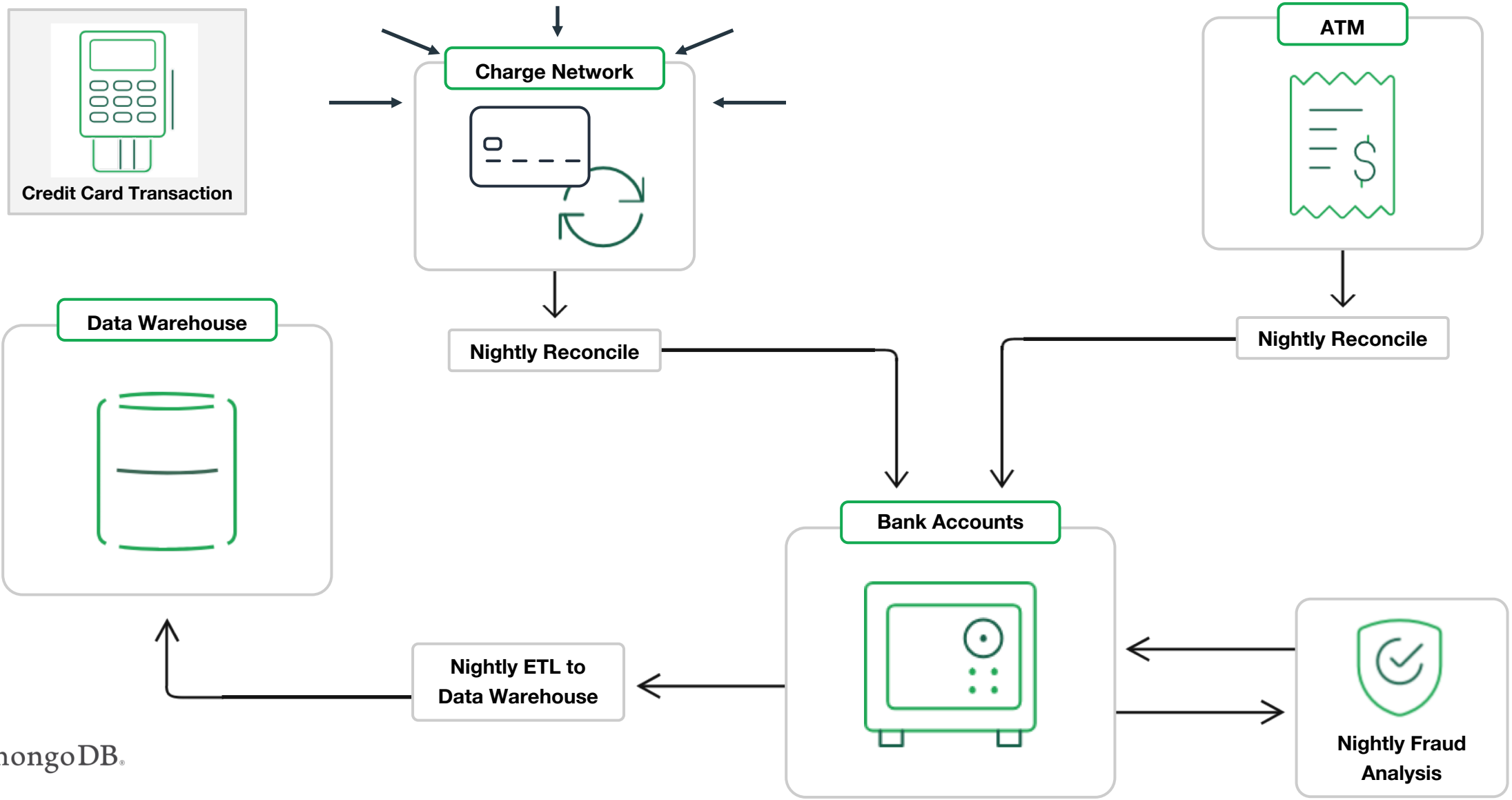
Microservices communicate with each other through well defined, network-based APIs

The **Event Streaming Platform** provides the channels that allow events to pass between microservices and to connect microservices into complete applications

The database plays a central role in event-driven architecture. Although each microservice has its own database, the core database provides a central repository — providing an end-to-end view of the business

Fraud Detection & Remediation: The OLD Way

Batch jobs perform periodic analysis of data



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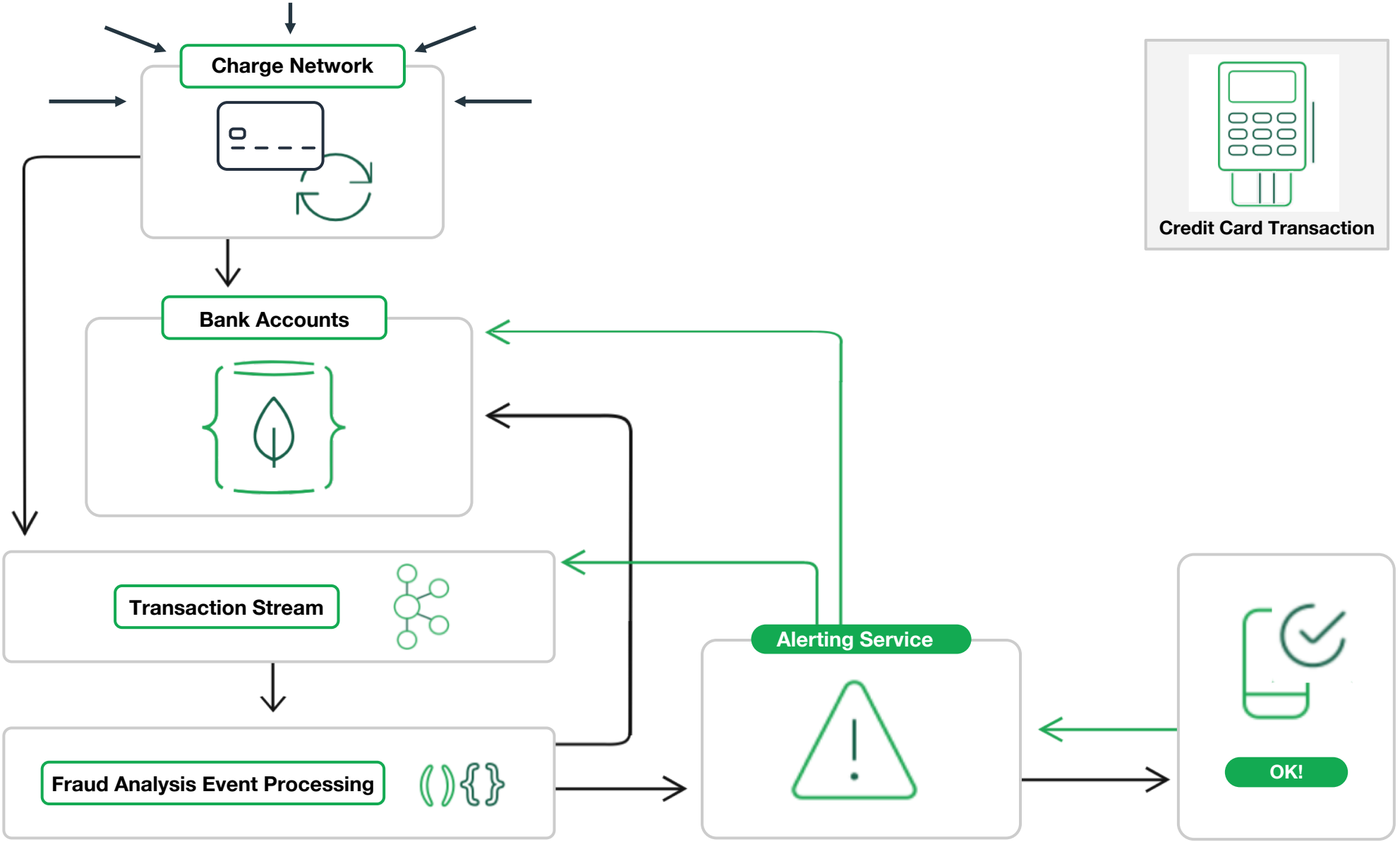
The Old Way: CX and Business Impacts

- Poor customer experience = Customer pain
  - Surprise and worry over declined charges
  - Time and effort reviewing statements and disputing charges, now and for some time into the future
  - Stress dealing with angry merchants who may blame customer for the issue
  - More time updating any accounts that were set up to autobill the old card to the new card number
- Poor technology and CX = Business pain
  - Cost of covering fraudulent charges
  - Support time/effort/resources
  - Emergency intervention takes engineers away from core projects/tasks

Fraud Detection & Remediation: The NEW Way

With real-time data



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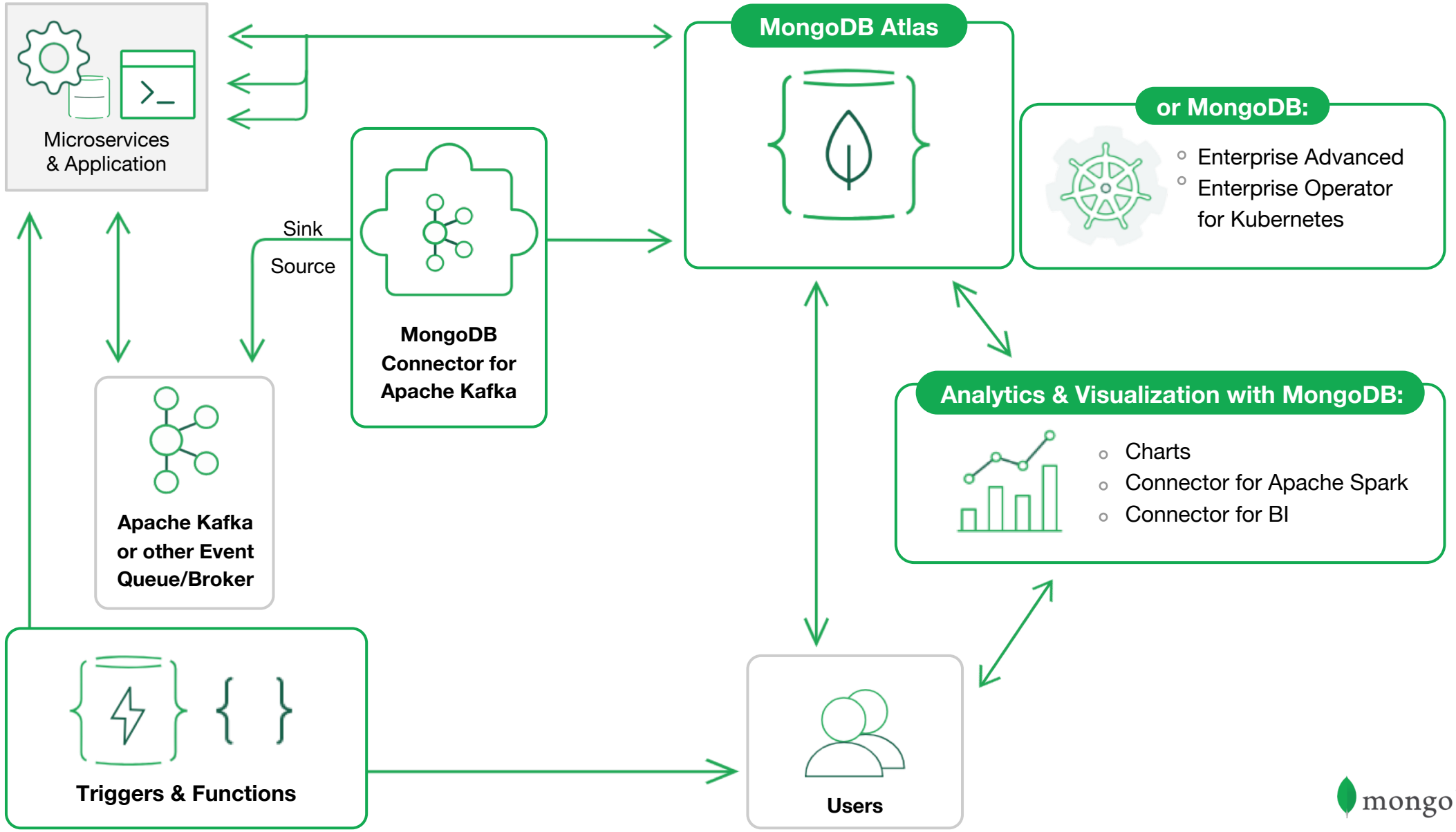
The New Way: Technology-CX-Business Benefits

- Capturing/acting on events in real time
  - Only way to effectively implement fraud detection & remediation
  - Significantly reduces the risk of fraud
  - Lets data scientists quickly update threat models
- Delivering superior customer experiences
  - Enhances customer sat, Net Promoter Scores, retention
  - Supports future upsell and cross-sell opportunities
  - Increases opportunity for increased Customer Lifetime Value (CLV)

Microservices and Event-Driven Architecture: Why MongoDB?

MongoDB Enables Event-Driven Architecture

MongoDB at the Heart of Event-Driven Architecture



Other Use Cases

Time Series and IoT

Predictive Maintenance

Telematics

Operational Data Layer

AI

Web Activity Tracking and Log Aggregation

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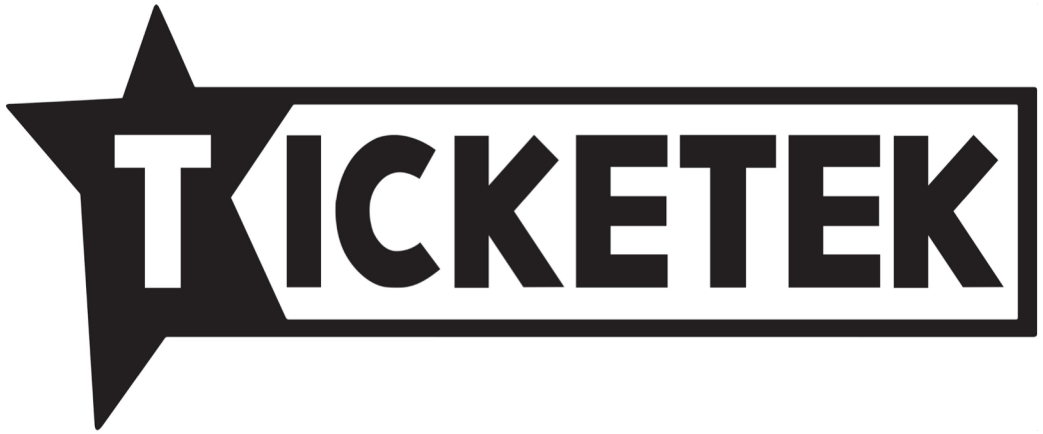
Who Uses this Architecture?

Customer Snapshot: Ticketek



Best in Class: MongoDB

Ticketek selected MongoDB over Oracle - SQL Server - MySQL - NoSQL options

Data Layer: MongoDB Atlas

Atlas is its global EDA data layer

Supports:

- Multichannel ticket sales and distribution network
- Streaming integration with customers and partners
- Real-time dashboards
- Millions of customers

Customer Snapshot: Man AHL

Global Financial Leader

One of the world's largest hedge fund investment firms

250 Million Ticks per Second

- MongoDB powers unified platform for all of Man AHL's financial data
- System receives data for up to 250 million ticks per second and writes it to Kafka
- Kafka consolidates/buffers events and stores them in MongoDB
- Researchers access data for analysis

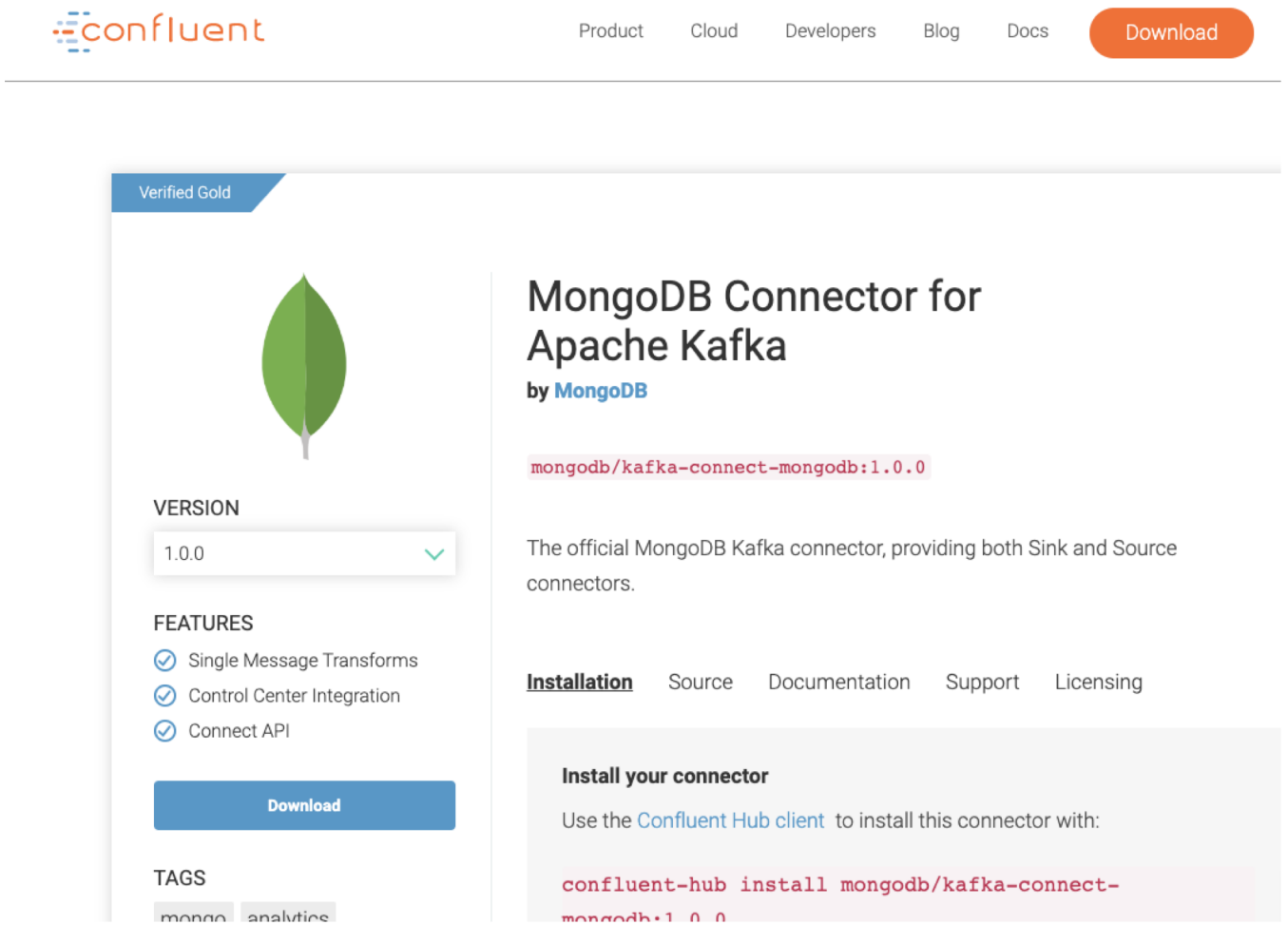
MongoDB Connector for Apache Kafka

Kafka Distributions - MongoDB support

- Apache Kafka
- Confluent Platform
- Confluent Cloud (fully-managed Kafka Clusters & Connectors)

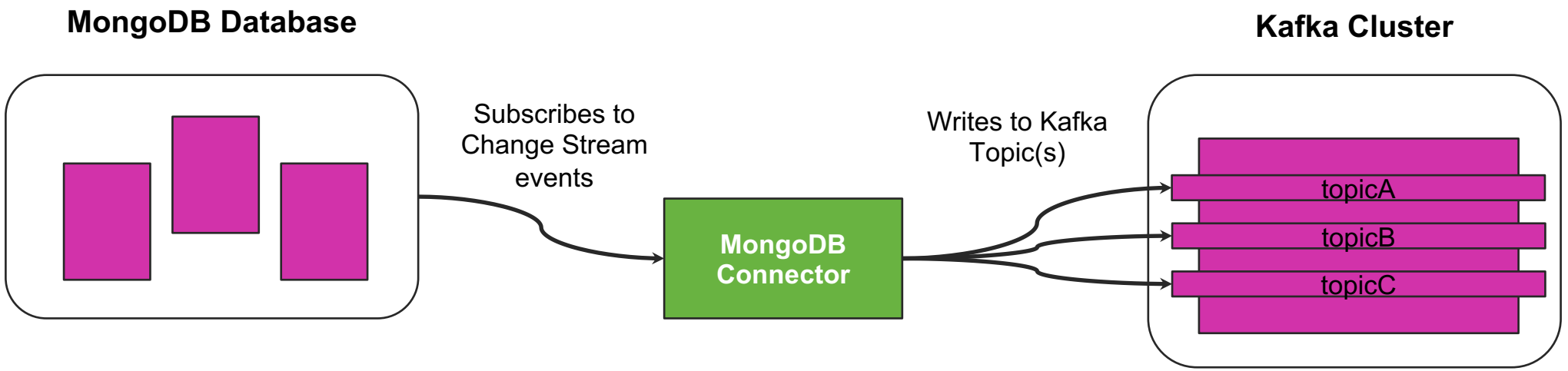
MongoDB Connector for Apache Kafka 1.0 GA

- MongoDB Sink
- MongoDB Source



https://www.confluent.io/hub/mongodb/kafka-connect-mongodb

MongoDBSource

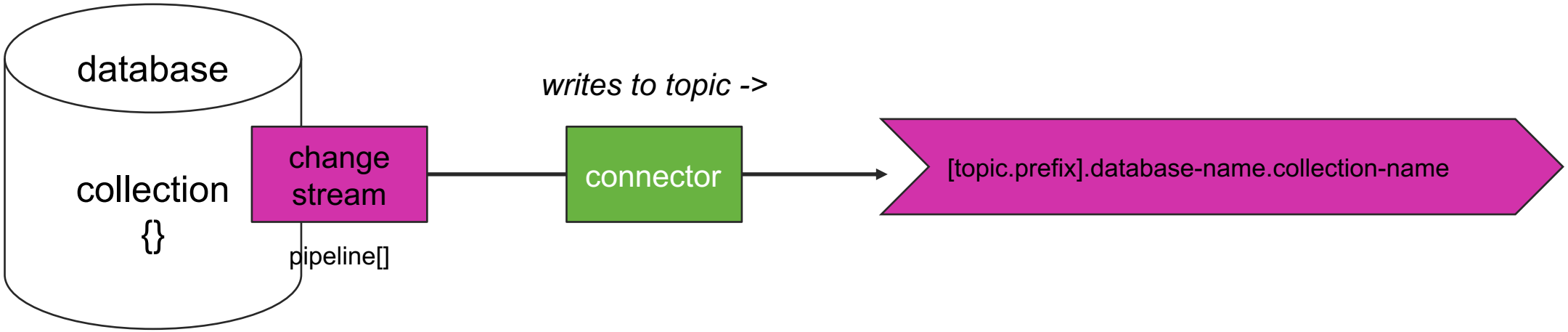


When MongoDB is a Kafka Source...

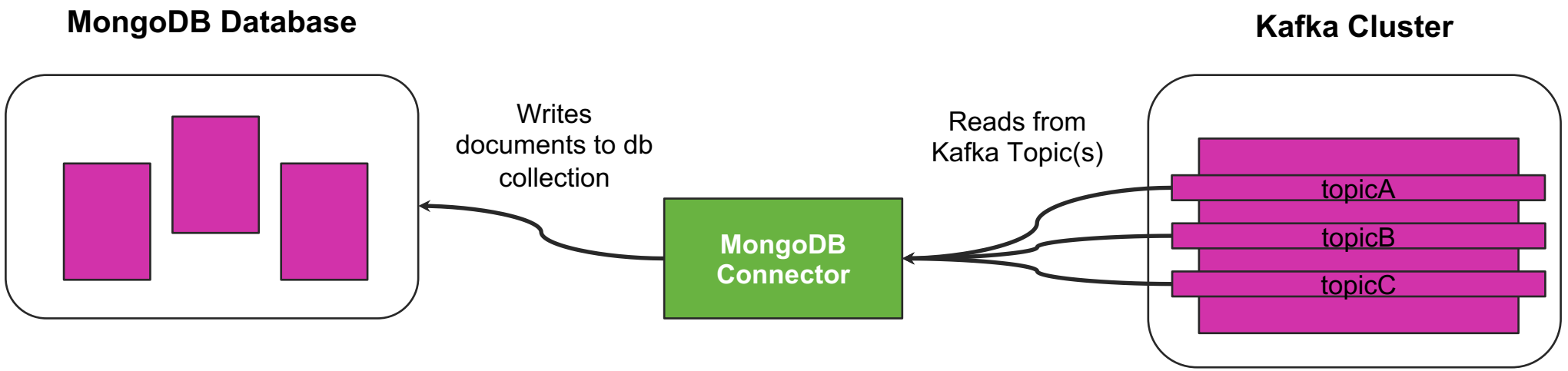
Subscribes to change stream events and writes to Kafka topic(s)

MongoDBSource: Writing to a Topic

- Writes to topic based on database and collection name
- Optionally specify pipeline to manage change stream output to watch
- Optionally set a topic.prefix in the connector configuration



MongoDBSink

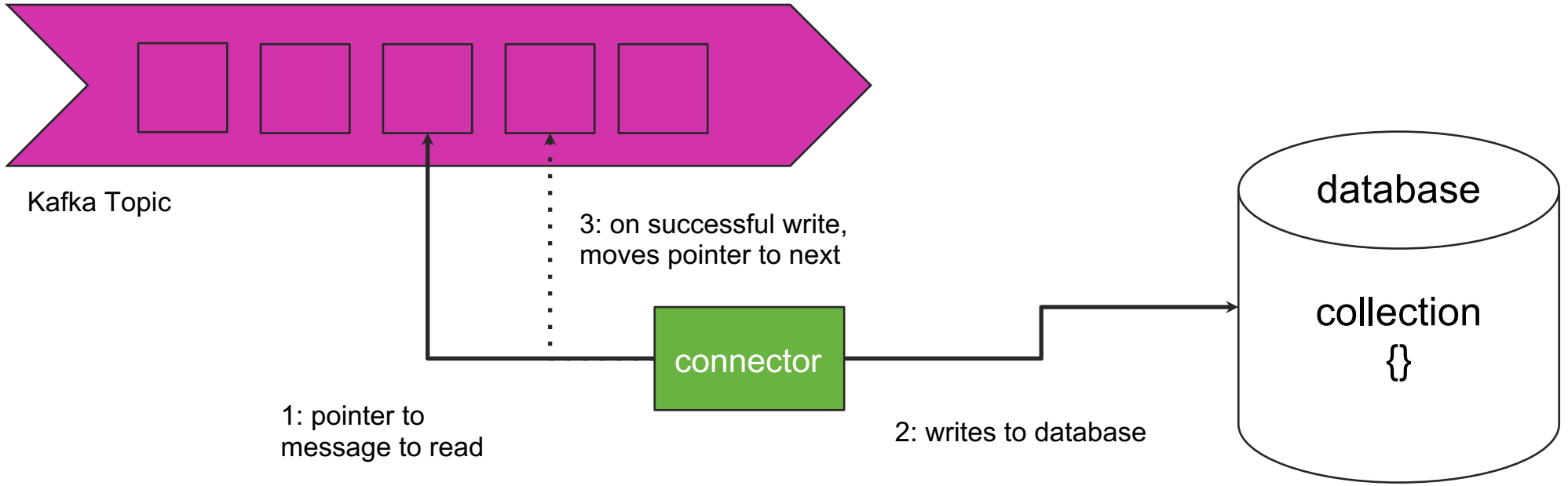


When MongoDB is a Kafka Sink...

Reads from Kafka topic(s) and writes documents to collection

MongoDBSink: Reading Messages from Topic

- Reads messages from topic (based on pointer to message in topic)
- Writes message into MongoDB database collection
- Moves pointer to next message based on write to database



Demonstration: MongoDB Source & Sink

MongoDB Connector Resources

Product Doc	https://docs.mongodb.com/kafka-connector/current/
Web	https://www.mongodb.com/kafka-connector
Source Code	https://github.com/mongodb/mongo-kafka
Connector Docs (configuration)	https://github.com/mongodb/mongo-kafka/tree/master/docs