Adam Bellemare – Building Event-Driven Microservices

8. Building Workflows with Microservices

The Choreography Pattern

- microservice architectures
  - Direct-call microservice architectures — reusable services
  - Event-driven microservice architectures — reusable events
- Choreographed architectures (aka Reactive architectures)
  - A subtype of Event-driven architecture
  - highly decoupled microservice architectures
- Simple event-driven choreographed workflow

- Change of workflow requires many changes

Both services C and B must be edited to consume from streams 1 and 2, respectively

The Orchestration Pattern

- ⚠️ There is a centralized coordination!

The orchestrator issues commands to and awaits responses from subordinate worker microservices

Simple orchestrated event-driven workflow

- Materialization of events issued from orchestration service

Input event ID	Service A	Service B	Service C	Status
100	<results>	<results>	<results>	Done
101	<results>	<results>	Dispatched	Processing
102	Dispatched	null	null	Processing

- Orchestration can also use a request-response pattern
  - Event-driven workflows — generally more durable

Simple direct-call orchestrated workflow

  - Direct-call workflows — generally faster

- Change of workflow is in single place — e.g. Airflow DAGs or Camunda BPMN schema

Distributed Transactions

- ⚠️ It is best to avoid implementing distributed transactions whenever possible

Choreographed Transactions — The Saga Pattern

Choreographed transaction success

Choreographed transaction failure with rollbacks

Orchestrated Transactions

Simple orchestrated transaction topology

Simple orchestrated transaction with a failure in the transaction

Issuing the rollback commands in an orchestrated transaction

- ⚠️ Just as each microservice is fully responsible for its own state changes, it is also responsible for ensuring that its state is consistent after a rollback

Compensation Workflows

- 👍 can remedy the situation based on the business's customer satisfaction policies

As a form of compensation, the business could order new stock, notify the customer that there has been a delay, and offer a discount code for the next purchase as an apology.

- Not always possible