Event-Driven Programming

What is an Event?

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- Event
  - An event is a change in state, or an update, like an item being placed in a shopping cart on an e-commerce website.
- Event Broker/Manager/Bus
  - Middleware that mediates the communication of event messages between producers and consumers using the various message exchange patterns

What is Event-Driven Architecture?

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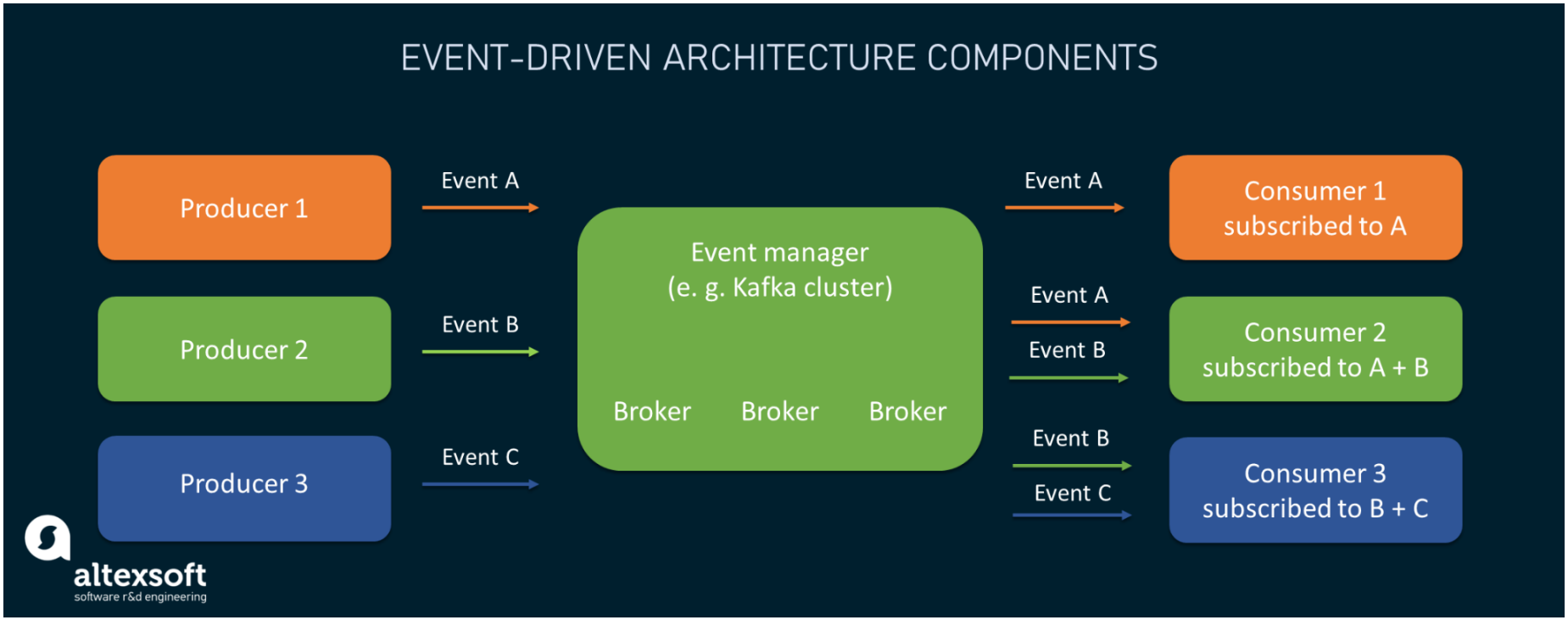

Pub/Sub and Observer Patterns

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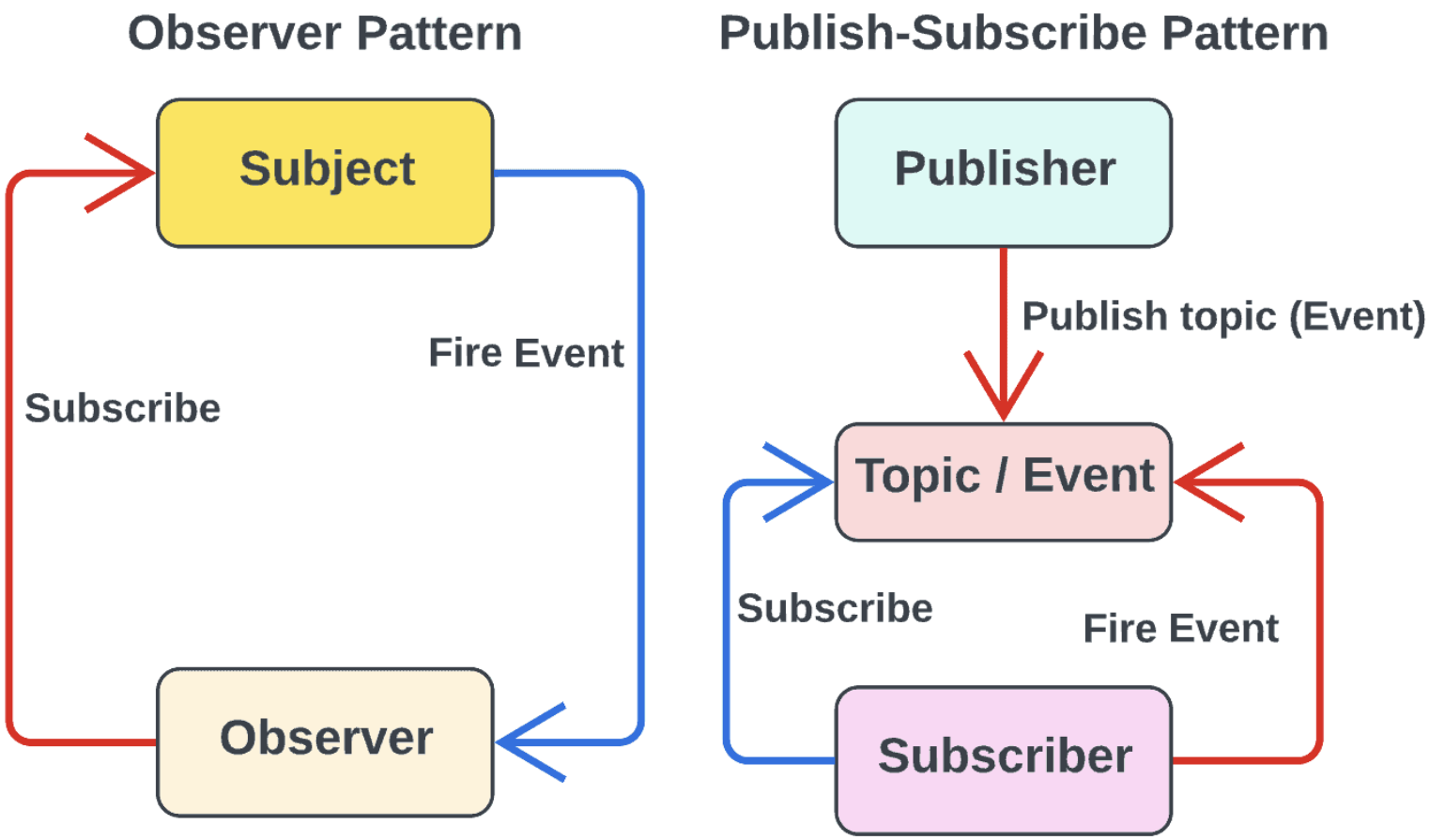

Kafka

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- Kafka
  - Apache Kafka is an open-source distributed event streaming platform used by thousands of companies for high-performance data pipelines, streaming analytics, data integration, and mission-critical applications.

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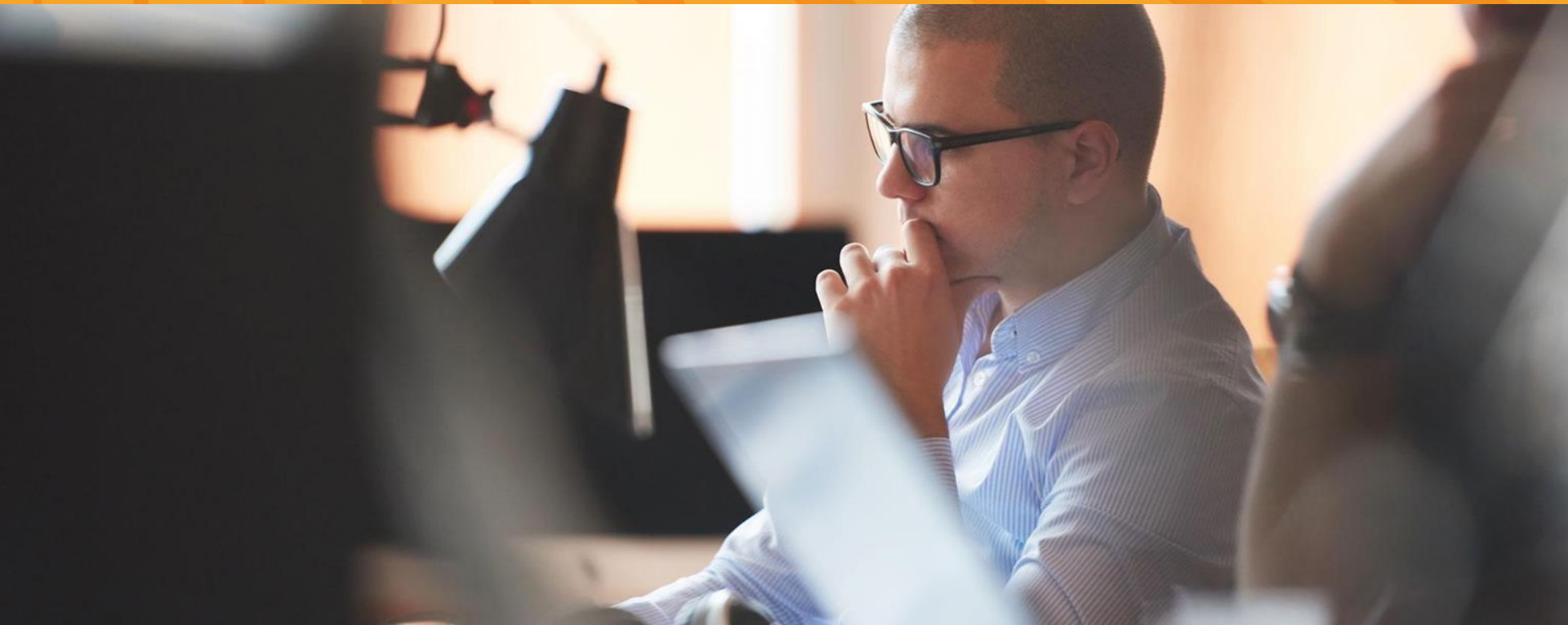
Basic Kafka Demo



More Advanced Architecture

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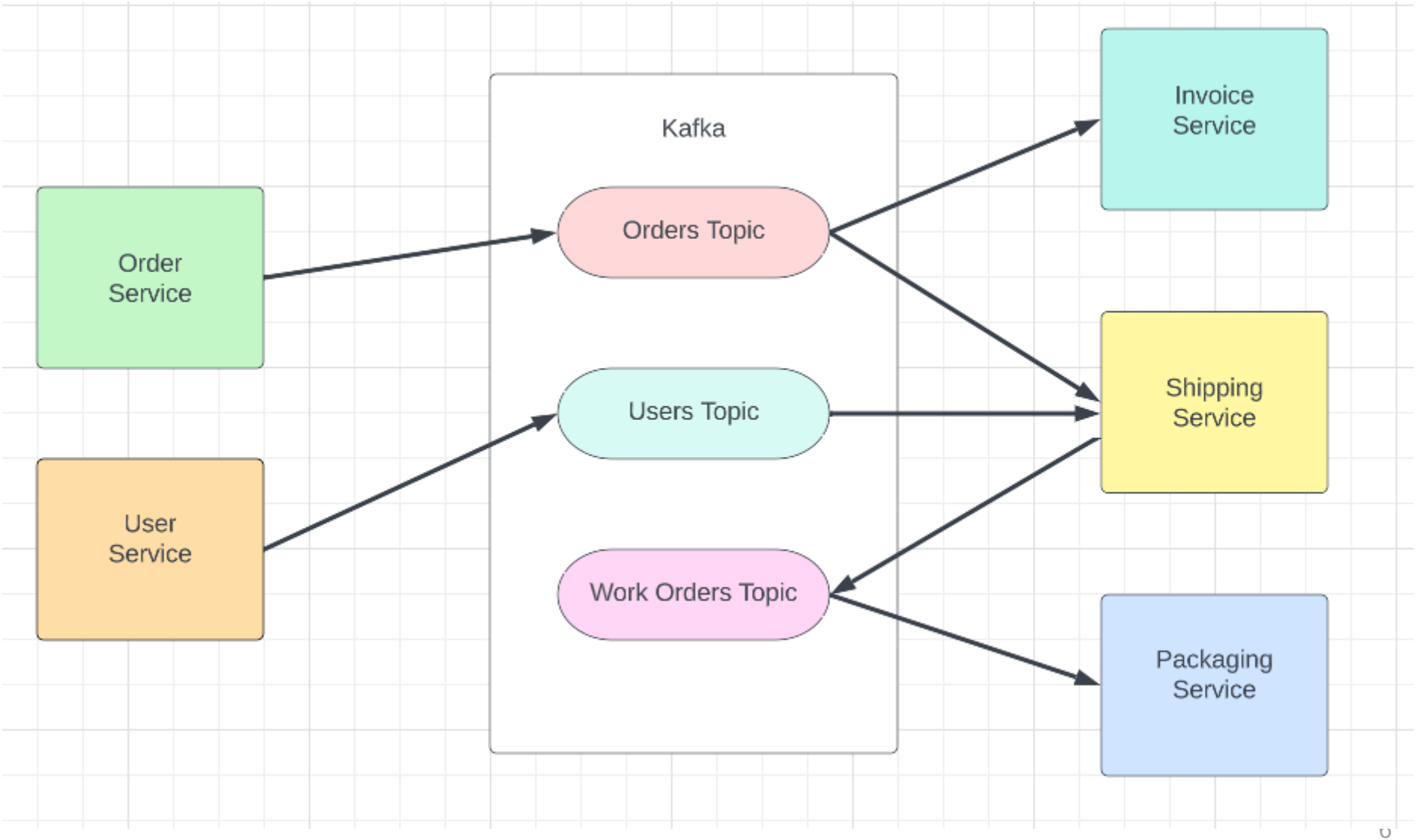

Microservices

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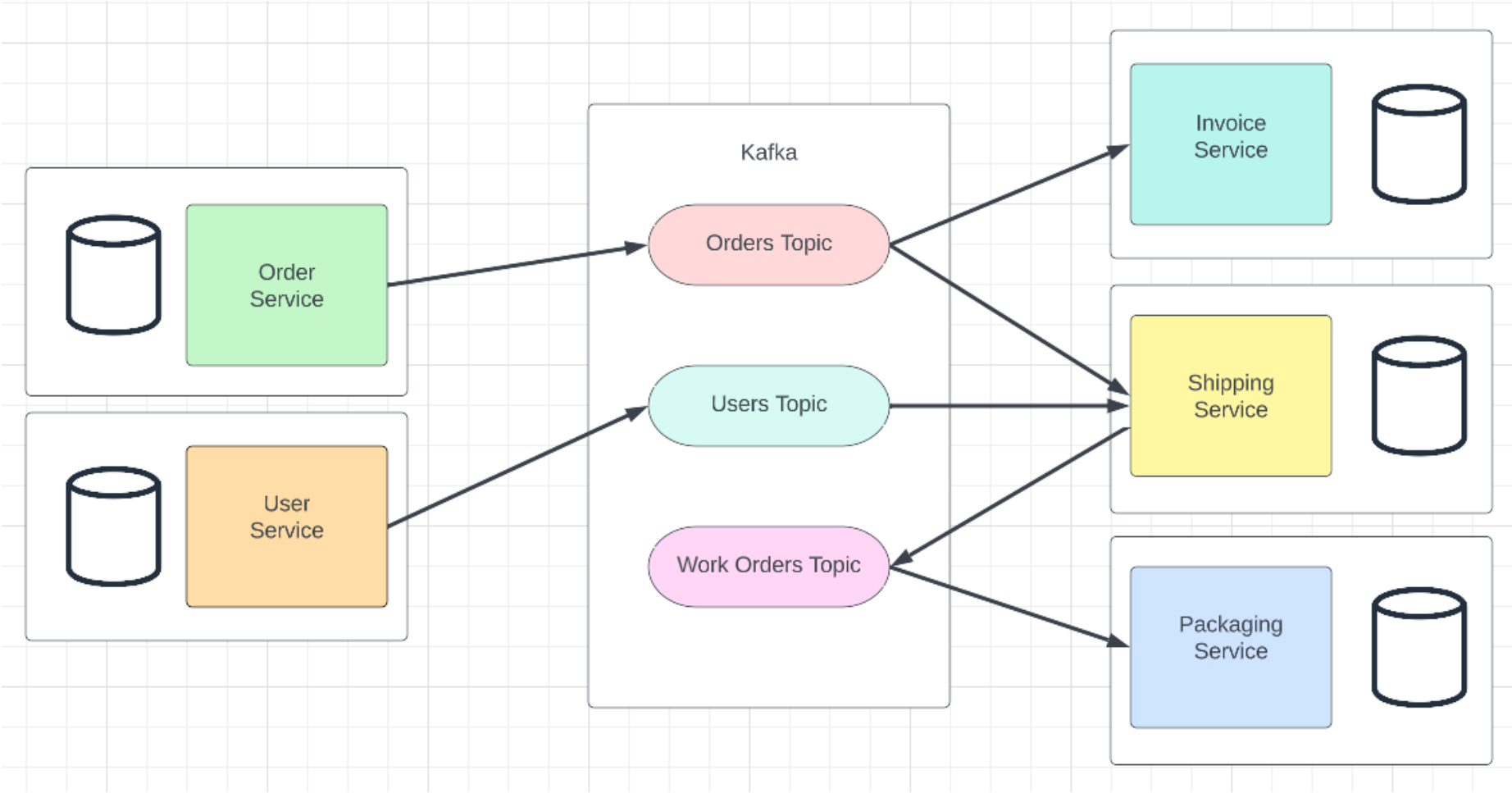

Advantages of Event Driven Architecture

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- Agility
  - Everything happens as soon as possible and nothing is waiting on anything else.
- Scalability
  - You don’t have to consider what’s happening downstream, so you can add service instances to scale.
- Loosely-Coupled
  - To add another service, you can just have it subscribe to an event and have it generate new events of its own – there’s no impact on existing services.

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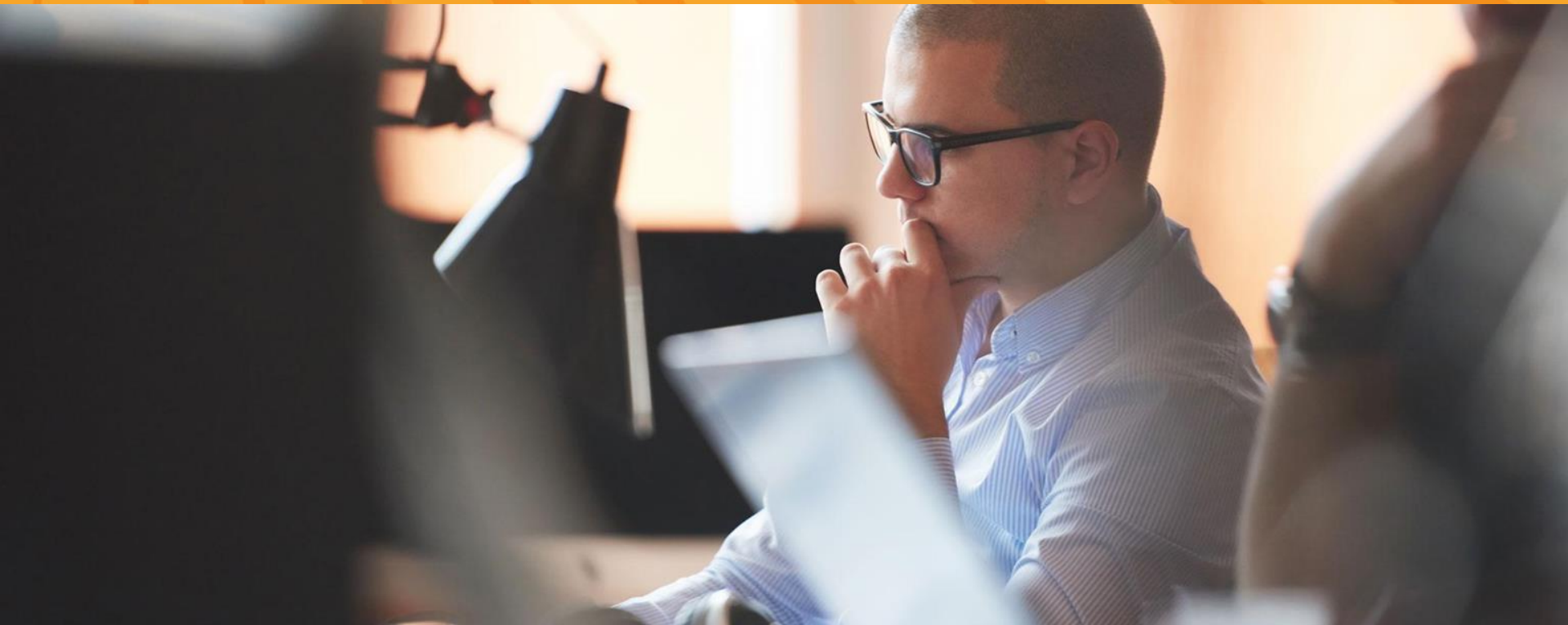
Ecommerce Demo



Drawbacks of Event Driven Architecture

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- Increased complexity
  - With too many events, producers and consumers associated with different business processes and workflows can be daunting to manage.
- Debugging and Troubleshooting Challenges
  - With the distributed and decoupled nature of event driven applications, it can be hard to trace an event from source to destination.
- Difficulties with Monitoring
  - Monitoring distributed, highly decoupled applications and systems can be trickier.