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# Apache Kafka

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# Exercise 1

- Implement a system with two (basic) consumers for the same topic
  - Consumer C1 prints records on the standard output
  - Consumer C2 processes each value (e.g., removes upper case letters) and stores the result to a new topic
    - Without delivery guarantees

- Consider a single instance for each consumer
  - What happens if one consumer fails?
  - What happens if you restart it?

# Exercise 2

- Now assume that you realize that consumer C2 is too slow
  - It cannot sustain the rate of messages added to the input topic
- How can you improve the performance of the system?
- Experiment with the system
  - What happens if one consumer fails?
  - What happens if you start multiple consumers?

# Exercise 3

- Now you want C2 to guarantee exactly-once semantics
  - Each input message should be delivered to the output topic once and only once

- Experiment with the system
  - What happens if one consumer fails?
  - What happens if you start multiple consumers?

# Exercise 4

- Modify C2 to store and forward the overall number of messages received for each key
- Consider a single instance of C2
  - What happens in the case of failure?
  - Does your implementation guarantee exactly-once semantics?
- How do your answers change in the case of multiple instances?